CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

Volume 7 SACRAMENTO, JULY, 1921 Number 3

CONTENTS.

	Page
CALIFORNIA HAWKS: HOW TO IDENTIFY THEM—*Harold C. Bryant*	133
A ROYAL SILVER TROUT CAUGHT IN LAKE TAHOE—*J. O. Snyder*	148
THE NEW CALIFORNIA STATE FISHERIES LABORATORY—*Will F. Thompson*	150
AN IMPORTANT DECISION ON THE FISHWAY LAW	154
EDITORIALS	157
FACTS OF CURRENT INTEREST	168
HATCHERY NOTES	169
COMMERCIAL FISHERY NOTES	174
NOTES FROM THE STATE FISHERIES LABORATORY	177
LIFE HISTORY NOTES	180
CONSERVATION IN OTHER STATES	185
REPORTS—	
VIOLATIONS OF FISH AND GAME LAWS	186
SEIZURES	186
EXPENDITURES	187
FISHERY PRODUCTS, JANUARY, FEBRUARY, MARCH, 1921	188

CALIFORNIA HAWKS: HOW TO IDENTIFY THEM.

By HAROLD C. BRYANT.

From being the most maligned of all birds, the hawks and owls are now coming to be recognized as among the most helpful to mankind. Members of this group have been continually persecuted because a few species have shown themselves to be destructive to domesticated birds and mammals. Each hawk and owl has been judged by circumstantial evidence, and prejudice has caused the good to suffer with the bad.

In recent years, the farmer has come to a realization of the great damage caused by ground squirrels, gophers and other rodents and he

is willing that all the natural enemies of these pests should be encouraged. As a consequence, state laws protect the beneficial species of hawks and blacklist the destructive ones. Nevertheless, a beneficial hawk hanging on a roadside fence or tacked to the side of a barn is still a too prevalent sight. With the exact data on food habits that we now possess, there is no excuse for ignorance as to the economic value of each species.

In the hope of stimulating interest in the preservation of the beneficial raptores the following analysis of the destructive and beneficial hawks has been made, together with a field key, which, it is hoped, will make identification possible.

BIRDS OF PREY.

Birds of prey are recognized by strongly hooked bills with a soft skin, the "cere," surrounding the nostrils, and by the large strong feet with flexible toe joints, and long, curved, sharp talons which are powerful weapons for grasping and killing prey. Of particular use are the latter in holding the prey while it is torn to pieces. In the vultures, which are carrion feeders, the talons are not so well developed. All have a swift, sure flight. Their whole structure betokens "strength, activity, ferocity, and predatory nature." Although the above anatomical characteristics are held in common by all the raptores, yet a close study shows that the different species are grouped together because of like habits rather than because of like structure.

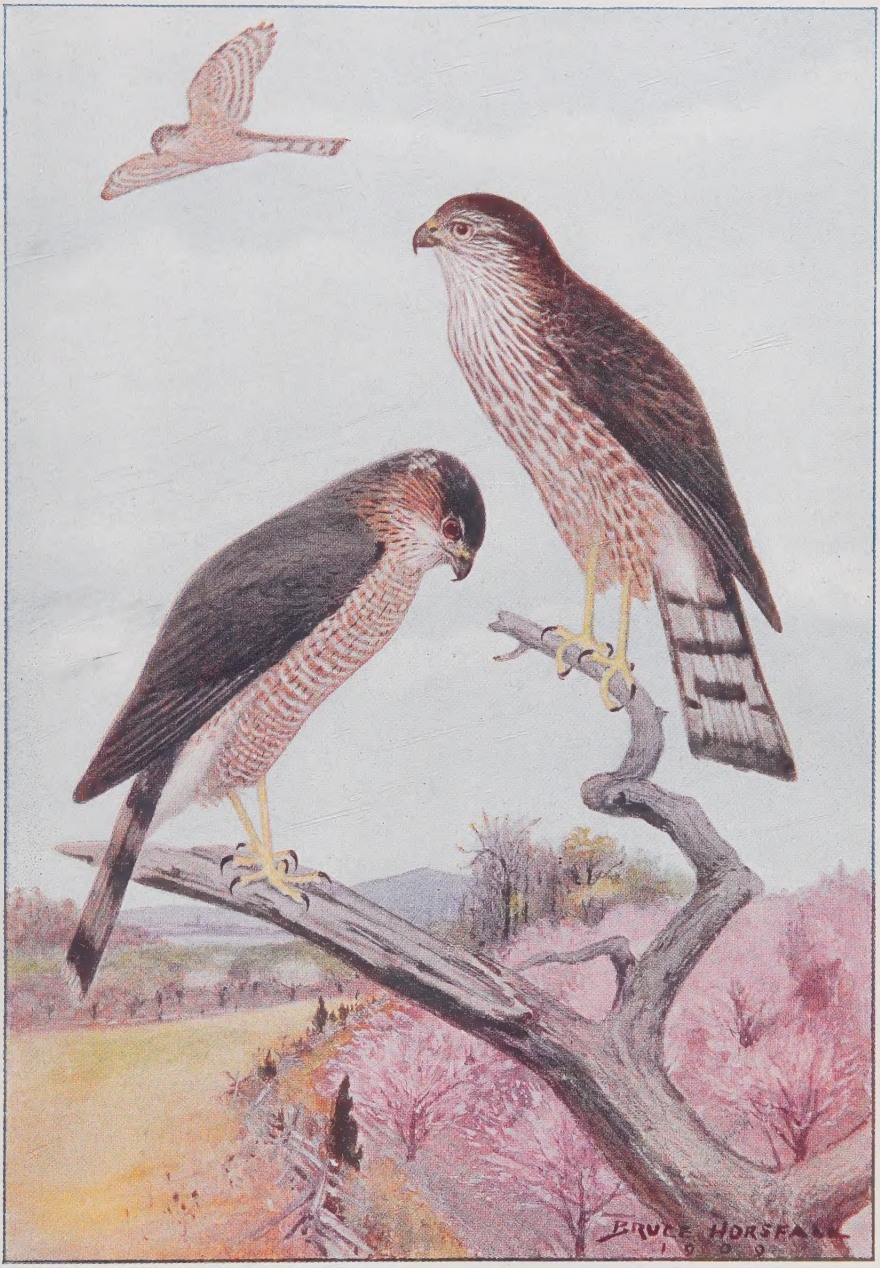
Hawks fly by day, and in the economy of nature owls take their place at night. The owls may be distinguished by their eyes being directed forward and by the disks of radiating feathers which surround the eyes. They are among the few birds which have binocular instead of monocular vision. Hawks have less fluffy plumage and smaller heads than owls.

The hawks are slow breeders, most of them laying but two eggs each season and rearing but one brood each year. The young grow very slowly and remain in the nest for a considerable period of time before developing the powers of flight.

Identification of hawks is oftentimes made difficult because the same species frequently has two color phases. Blackish or melanistic forms are of frequent occurence in several species of beneficial hawks. Since dark colored birds do not appear among the destructive bird eating hawks, it is safe to say that all black hawks are useful. Another means of discriminating between good and bad hawks is to be found in the seasonal occurrence; the destructive hawks are almost invariably winter visitants, consequently, the chances are that hawks shot in the summer are beneficial ones.

As a rule the sexes are colored alike. There is, however, a marked difference in size, the female being the larger. The fluffy juvenile plumage makes the young bird appear larger than the adult.

The food is made up chiefly of rodents and insects, and the birds gorge themselves whenever opportunity offers. Although the flesh is often picked from the bones, small animals are usually swallowed whole. Indigestible parts are often regurgitated in the form of pel-



SHARP-SHINNED HAWK

(Right Hand Figure, Immature Female; Left Hand Figure, Adult Male)

Order—Raptores
Family—Falconidæ
Genus—Accipiter
Species—Velox

National Association of Audubon Societies

lets. The hair, bones, and other elements in a pellet can be identified and a comprehensive idea of the food may be obtained by a study of such pellets.

KINDS OF HAWKS.

Hawks are usually divided into four main groups: The meadow hunters, known as *harriers* (represented by but one form, the marsh hawk); the woodland hawks, known as *accipiters;* the soaring hawks, the *buteos* and eagles; and the "long winged chasing" hawks, known as *falcons.* Sometimes the carrion feeders, known as *vultures,* are included.

THE BLACKLIST.

By far the larger number of hawks are beneficial. It is, therefore, better to know the villians than to attempt to know all of the beneficial species. Attention is accordingly called to the following hawks which may properly be blacklisted. State laws give these hawks no protection.

All of the destructive species belong to the third group, the *accipiters.* All are typical bird hawks with long tails, short rounded wings, comparatively small heads, and with a rapid, darting flight. In the open their flight consists of alternate flappings and sailings. Seldom, if ever, do they give any cry. All habitually frequent wooded or brushy areas. These birds usually watch for their prey from some vantage point and dart in among the trees or brush to secure it. In the hand, they are readily identified by their short broad wings, and slender unfeathered legs and feet.

Three of the destructive species are very much alike in coloration and habits, their main difference being in size. We can, therefore, speak of three editions of the "chicken hawk." The first is the small sized "chicken hawk" known as the "sharp-shinned hawk." (See plate 1.) The second is the medium sized bird and perhaps the best known of all those attacking poultry, the Cooper hawk, sometimes called the "bullet hawk," and rightly called a "chicken hawk." An additional field character, to that of size in distinguishing the sharp-shinned from the Cooper hawk, is to be found in the shape of the tail. The tail of the sharp-shinned hawk is square-ended, whereas, that of the Cooper hawk is rounded. The third is the larger species found only in the higher mountains and in the northern part of the state, the western goshawk. All three are sometimes dubbed "blue darters" because of their manner of hunting. Very often they capture their prey in mid-air. The adult goshawk can be recognized in the open by its bluish colored back and wings and barred breast, as constrasted with the striped or streaked breast of the Cooper and sharp-shinned hawk. The young of the goshawk, however, have streaked breasts and can easily be confused with the Cooper hawk.

The food of these three hawks is made up almost entirely of birds, the larger species feeding to a considerable extent on such game birds as quail and grouse, in fact, to such an extent that the Cooper hawk is often known as the "quail hawk" and the goshawk as the "grouse hawk." The Cooper hawk often attacks pigeons and returns day after day to claim a victim. Stomach examination has shown that this hawk feeds almost wholly upon wild birds and poultry. Of all the common hawks this is the most "audacious highwayman." It preys commonly

on valley quail. In a nest of a pair of Cooper hawks in the San Jacinto mountains the remains of three chickens, a blue jay and a chipmunk were found (Grinnell and Swarth, 1913). The sharp-shinned hawk, of much smaller size, feeds upon the smaller birds, almost all of the commoner song birds falling prey to it. In the Fresno district, the birds which seem to suffer most from attacks by the sharp-shin are mockingbirds, intermediate sparrows, valley quail, and say phoebes (Tyler, 1913). This hawk dashes in and out among trees and shrubbery and often perches on larger limbs inside the foliage. It is most common about willow thickets and the trees along streams. A crashing sound as it strikes a bird in the foliage often betrays its presence and little bunches of feathers bear mute evidence of tragedies enacted. All

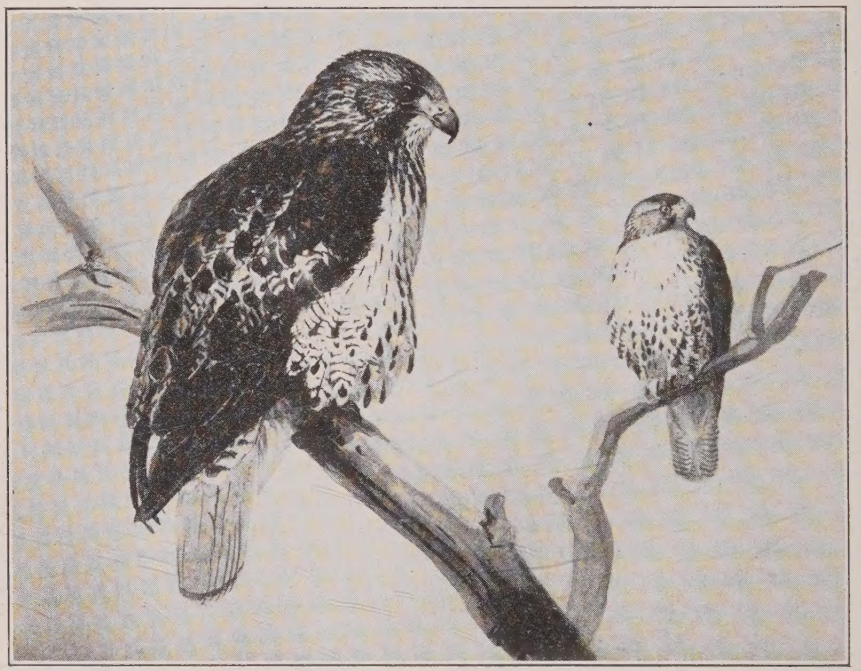


FIG. 42. Red-tailed Hawk (*Buteo borealis*). Courtesy of the United States Bureau of Biological Survey.

three species are likely to make their appearance in the chicken yard, in fact, about ninety-five times out of a hundred it is one of these three hawks which is to blame when poultry is found to have been taken by a hawk.

The duck hawk is the most powerful of the destructive species. It is a true falcon, and in Europe was considered the "noblest" of the birds used in falconry. It fearlessly attacks ducks and has even been known to attack some of the larger waterfowl. The rush of wings at it attacks its prey is said to resemble a heavy wind. Its food comprises birds, both game and nongame. Birds recorded as falling prey to the duck hawk in California are as follows: blackbirds, meadowlarks, red phalaropes, black turnstones, murrelets, auklets, ducks, doves, jays, and even sparrows. Furthermore, it is said to kill apparently for pleasure. At

any rate, it often kills more birds than it eats. Stomachs of two duck hawks from southern California, each contained the remains of a mourning dove. The short tail, pointed wings, slate-colored back, and black patches on the face should help in identifying this bird; but the general actions are still more useful in recognizing it.

The prairie falcon, much like a duck hawk in appearance, lives in the rough foothill country, nesting about cliffs, and is noted as a destroyer of ground squirrels. Although a close relative to the duck hawk, it is to be numbered among the beneficial species.

BENEFICIAL HAWKS.

The two best known beneficial hawks are the red-tailed hawk (see fig. 42) and the sparrow hawk (see fig. 43). The former is the large

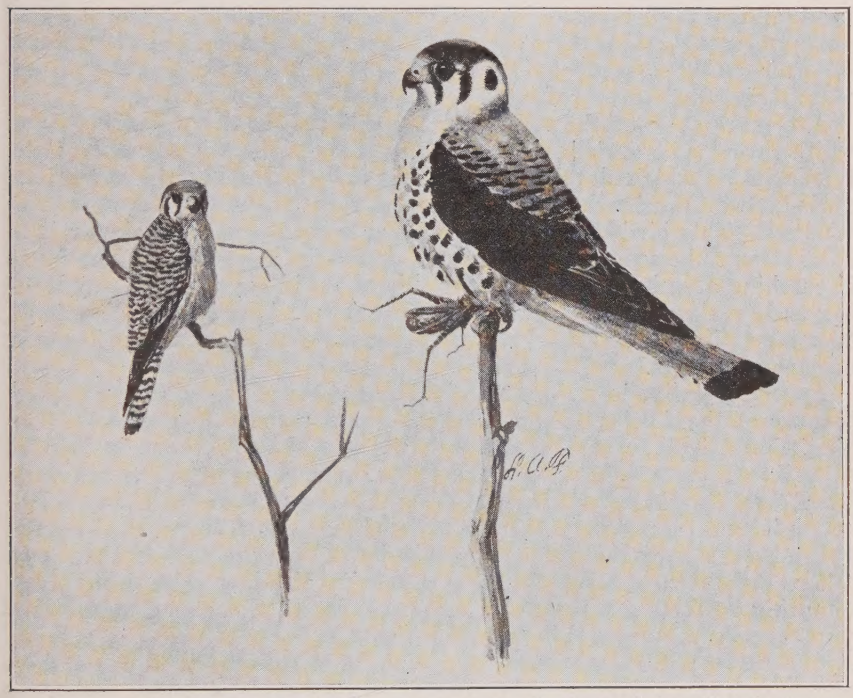


FIG. 43. Sparrow Hawk (*Falco sparverius*). Courtesy of the United States Bureau of Biological Survey.

hawk commonly misnamed "hen hawk," which is most often to be seen soaring around and around high in the air over open country, or perched conspicuously on top of a dead tree or telegraph pole. In the adult bird, the tail is reddish brown, but in the young birds the tail is barred. The common hawk call, sounding like the syllables "*pee-yare,*" which so often drives poultry to cover, is given by this bird, but it very seldom bothers birds of any kind. The red-tailed hawk is a typical rodent hawk, having large clumsy feet suitable for capturing small animals on the ground. In flight also, the bird is too slow and clumsy to be successful in capturing birds. The occasional red-tail that attacks poultry

is usually a young bird, showing that the species prefers other types of food.

The food of this hawk is made up very largely of ground squirrels and mice, to which is added a goodly supply of some of the larger insects, such as crickets and grasshoppers. The stomach of a red-tailed hawk taken in the Berkeley hills contained one meadow mouse and two pairs of jaws of the common "potato bug," or "Jerusalem cricket." One red-tail taken in Los Angeles County contained a gopher; and three others were found to have been feeding on rabbits (Bryant, 1918). Over ninety per cent of the food of this hawk is made up of noxious mammals and insects. Remains of two ground squirrels were found in the nest of a pair of red-tails in San Diego County (Dixon, 1917). In nests of the red-tail remains of gophers, ground squirrels, meadow mice, a young cottontail rabbit, and two snakes—a striped racer and a gopher snake—were found (Dixon, 1906). The red-tail preys upon snakes and may often be seen carrying a snake in its talons. Stomach analyses made by the government show over eighty-five per cent of the food to be rodents.

A near relative of the red-tailed hawk is the Swainson hawk with a white throat and dark band across the breast. This is the only California hawk which develops a flocking habit. During the migration period, Swainson hawks may be seen in flocks moving leisurely across country. This bird might well be called a grasshopper hawk for it is most often to be seen capturing grasshoppers in open fields. The birds in catching grasshoppers are said to skip about in an awkward way looking as if rather ashamed of the performance. This species also feeds on mice and gophers (Tyler, 1913). This is a fairly common hawk in our great valleys.

Another relative less often seen is the ferruginous rough-leg, so called because of the feathering on the legs, which reaches to the toes. The bird, figuratively, wears boots, and this booted appearance is helpful as an identification mark, also the white underparts, often with a dark band, and the white patch at the base of the tail on each side. The rough-leg prefers open country and is often to be seen perched on the ground near squirrel burrows. This hawk, perhaps more than any other, merits the name "squirrel hawk." Meadow mice also prove tempting as food. A rough-leg taken at Cotati, Sonoma County, contained seven meadow mice (Bryant, 1913).

The rarer red-bellied hawk is a bird of the lowlands and marshes, recognized by its reddish brown breast and its mode of flight, which reminds one of that of a horned owl. This hawk feeds on caterpillars, insects and small rodents. The stomach of one bird taken near Corona, Riverside County, contained "potato bugs" (*Stenopelmatus*) and beetles, and that of another a pocket gopher (Pierce, 1919). The stomach of a third taken in Fresno County contained large hawk moth caterpillars, beetles and "potato bugs" (*Stenopelmatus*), (Bryant, 1921). In the nest of a pair of red-bellied hawks in San Diego County, was found one ground squirrel and two pocket gophers, carried there to feed the three young birds in the nest (Dixon, 1917). In another nest was found a brush rabbit, hair of a ground squirrel and an alligator lizard (Sharp, 1906). Stomach examination has shown fence lizards (Dixon, 1906), Jerusalem crickets and caterpillars.

The golden eagle (see fig. 44), although often accused of stealing farm animals and poultry, is deserving of careful protection, for its food is made up almost wholly of the larger rodents. A nest examined by J. B. Dixon in San Diego County, contained the remains of eleven ground squirrels, largely the surplus carried to the two young birds in the nest (Dixon, 1917). Rabbits and ground squirrels are the principal items of food. The notable decrease in numbers has been due to the desire

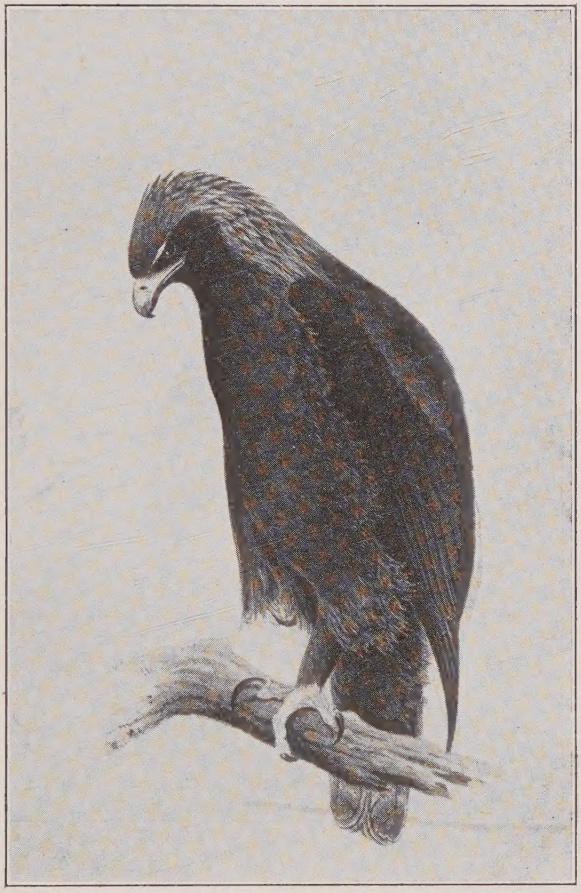


FIG. 44. Golden Eagle (*Aquila chrysaetos*). (Drawn by R Ridgway.) Courtesy of the United States Bureau of Biological Survey.

of many to kill something large, not to a desire for relief from depredations. It is particularly important that the golden eagle be left unmolested by the rancher.

The bald eagle (see fig. 45) depends so largely upon fish as a diet that it is almost invariably found along the sea coast or about large inland lakes. An occasional fawn, lamb, or pig is taken, but this eagle is primarily a fisherman. On San Clemente Island and other islands of the

Santa Barbara group, where this eagle nests, it is said to feed on sheep and lambs, as evidenced by bones near the nest (Howell, 1917).

The sparrow hawk (see fig. 43) is the smallest and usually the most common of all and is often to be seen perched on fence posts or telegraph poles. It has a cry that sounds something like the words *"killy-killy-killy-killy,"* which sometimes gives it the name of "killy" hawk. The reddish brown tail of the adult and the black bars on the face will

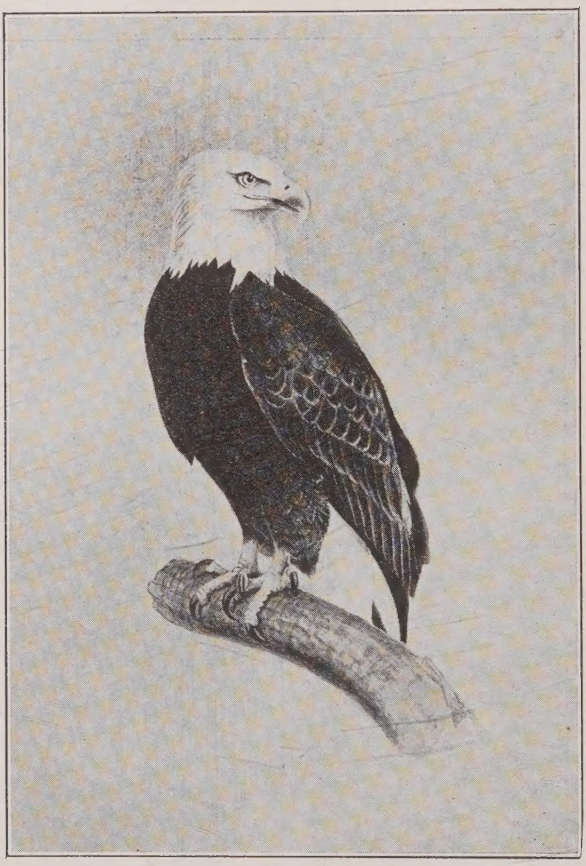


FIG. 45. Bald Eagle (*Haliaeetus leucocephalus*). (Drawn by R. Ridgway.) Courtesy of the United States Bureau of Biological Survey.

help in the recognition of the bird, as will also its habit of poising in the air with beating wings. The sparrow hawk develops speed and captures its prey by dashing directly after it.

From the sharp-shinned hawk the sparrow hawk is distinguished by sharp, pointed wings which are in contrast to the short, rounded wings of the former. In the hand all of the falcons may be recognized by the notch near the tip of the bill which is lacking in other hawks. Although called "sparrow" hawk, this hawk very seldom preys upon birds, preferring large insects and mice. Grasshoppers and large beetles form

the principal items of food. Tyler (1913) reports grasshoppers as the staple diet of some sparrow hawks in Fresno County.

The less common pigeon hawk is to be distinguished from the more common sparrow hawk by its darker coloration, by a blackish instead of a brown tail, and by the white throat patch. This hawk has a habit of perching humped up on conspicuous perches and when frightened flies swiftly and fairly close to the ground to another perch not far distant. The pigeon hawk does not confine itself so largely to insects as does the sparrow hawk and is guilty of preying upon small birds as well as rodents.

In lowland country the marsh hawk (see plate 2) is a familiar bird with its long wings, long narrow tail and white rump patch. It is usually to be seen flying along with leisurely strokes of the wings, about three or four feet above the ground, quartering back and forth over the meadows and marshes searching for its prey, which is comprised almost entirely of meadow mice. On the sight of a mouse the bird suddenly plunges downward and makes off with the luckless animal. The marsh hawk will occasionally help himself to a bird, or even to poultry if available. The author once saw a marsh hawk make off with a killdeer. It will be found, however, that individuals, rather than the species as a whole, are responsible for depredations of this kind. With the possible exception of the skunk, there is no animal that exerts better control on meadow mice than the marsh hawk.

Young marsh hawks are reddish brown all over, but the adult male has a whitish breast, gray back, and wings with black tips—suggestive of a gull. This is the only American hawk belonging to the *harrier* or meadow hunter group and the only hawk which nests on the ground.

The white-tailed kite, another hawk which is gull-like in appearance and which frequents the marshes, is now very rare in California and needs careful protection to save it from complete extermination. Its food habits proclaim it a beneficial hawk. The stomach of a specimen from Santa Rosa contained a meadow mouse.

The osprey, or fish hawk, is found along the sea coast and around the larger bodies of water in the interior. The white head and breast are conspicuous. This bird feeds exclusively on fish, especially such slow moving ones as carp and suckers.

The United States Department of Agriculture has pointed out that "the sooner farmers, ranchers, horticulturists, and nurserymen learn that the great majority of birds of prey are their friends, and deserve protection, the sooner will depredations of noxious rodents and insects diminish." By encouraging beneficial hawks time and effort is saved, for they automatically help control rodent and insect pests, being ever alert and ready to move to a center of infection. If given a chance, they will prove more effective than either traps or poison. Protection of hawks is the most economical pest control measure.

It must be remembered that even the so-called destructive hawks have their place in Nature, for natural enemies of birds tend to maintain within proper bounds the numbers of the species on which they prey and preserve their fitness. Many believe that the relation between the predator and the animal preyed upon is such that direct increase follows destruction of the predatory species. These same individuals maintain that on an area set aside as a refuge, increase of bird and animal life

will not be noticeable unless "vermin" be destroyed. Since in the early days abundance of game was coincident with abundance of natural enemies this contention does not seem reasonable. Rather should one understand that under natural conditions there is a certain balance struck between a species and its natural enemy and oftentimes the activities of one help to balance those of the other.

Forbush (1916) who defends the above point of view gives the following example:

"The marsh hawk (*Circus hudsonius*) feeds to some extent on marsh birds and their young, but a much larger part of its food consists of meadow mice and frogs. These mice certainly would be very destructive to young birds were they not held in check, and large frogs are known to swallow the young of water birds. Marsh hawks and other enemies prevent many frogs from reaching a size when they would be dangerous to young birds.

"If nature is undisturbed, therefore, all the birds are reared and maintained that the land will support, but when civilized man steps in and disturbs the natural arrangement and balance, then, and perhaps then only, the natural enemies of birds may become unduly destructive, and must be checked."

Rodents constitute our worst farm pests. Were it not for natural checks to their increase it would be impossible to grow crops. Field mice have from four to six litters of young a year with from two to thirteen comprising each litter. It has been estimated that one pair of meadow mice are capable of producing nearly a million young in five years. Of course, such an increase is never really possible because of natural checks, including natural enemies. To eliminate natural enemies or even reduce their number disturbs the balance and increases the numbers of the pest.

Of course, artificial means of check, such as trapping and poisoning, have been devised, but their use entails time, energy, and expense. By encouraging natural checks on the increase of rodents more can be accomplished with less expenditure of effort. Most hawks eat rodents, and herein lies the reason for their encouragement.

A FIELD KEY.

Lest the good hawks be destroyed with the bad it is necessary to distinguish friend from foe. Ability to recognize the different species of hawks is, of course, the shortest road to conservation of the beneficial and destruction of the injurious. The average person finds it difficult to name a hawk seen in the open by reference to the average bird book because the distinguishing characters given are those suitable for use with a dead bird or specimen. As an aid to identification of live birds in the open the following key of field characters is appended, a key which it will be found emphasizes quite different characters from the more familiar ones found in bird books. This key has been prepared as an experiment to determine whether keys of this kind are possible, or useful. No doubt more accurate observation would be productive of

N. B. The United States Department of Agriculture has issued several bulletins dealing with the economic value of hawks, notably the authoritative work, "Hawks and Owls of the United States," by A. K. Fisher, which may often be consulted in libraries. The value of each species is judged by the results of many stomach examinations. Another review of the value of hawks is to be found in the National Geographic Magazine, Vol. 38 (Dec., 1920), under the authorship of Louis Agassiz Fuertes.



MARSH HAWK

Order—RAPTORES
Genus—CIRCUS
Family—BUTEONIDÆ
Species—HUDSONIUS

National Association of Audubon Societies

still better field characters and in the light of later knowledge a better key devised.

The characters which must be studied in order to use the key are: mode of flight, shape or general countour, color, color markings, and habitat. Even a better character in some cases is the call, but this has not been widely used in the key because of the difficulty of conveying an idea of the call by means of syllables. Then too, some hawks are notably silent and others are heard to call only in the breeding season.

Field Key to California Hawks.

A Soaring flight; birds of open country, or large bodies of water.

B Body black or blackish brown in color.

C Head not feathered and reddish in color.

D About 30 inches in length, without white patches on underside of wings; wing tips silver gray beneath; carrion feeder_____ _____(Turkey Buzzard) TURKEY VULTURE

DD About 50 inches in length, with snow white patches on underside of wings (under wing coverts) appearing as windows when the bird is soaring overhead; carrion feeder; very rare _____ _____(Condor) CALIFORNIA VULTURE

CC Head feathered.

E Head and tail of adult white in color; bare yellowish legs; call *cac, cac, cac;* chiefly near sea or large bodies of water____BALD EAGLE

EE Head and tail of adult blackish brown; found in mountainous regions_____GOLDEN EAGLE

BB Body brownish in color; head feathered; thick set with broad rounded wings and broad spread tail.

F Less than 30 inches in length; under 4 feet wing spread.

G White patches on base of tail above; dark band separating white throat and belly; conspicuous black "wrist marks" under wing; legs feathered to base of toes; often perches on ground. (The American Rough-leg is a rare winter visitant which differs but slightly from the resident bird)_____ _____(Squirrel Hawk) FERRUGINOUS ROUGH-LEG

GG No white at base of tail; legs (tarsus) strong and unfeathered.

H Tail of adult reddish brown with whitish tip (immature birds readily confused with other Buteos); call a high pitched whistled *keee, keeee,* suggestive of the sound of escaping steam; tail spread fan-like in flight_____ (Hen Hawk; Buzzard Hawk) WESTERN RED-TAILED HAWK



FIG. 46. Outline drawing of the red-tailed hawk, made directly from a freshly killed specimen, showing the broad type of wing usable as a recognition mark for this bird and other Buteos.

HH Tail barred with brown and breast with band of brown; forehead, chin and throat white; commonly feeds on grasshoppers; only hawk displaying flocking habit; call *pi-tick, pi-tick, pi-tick,* frequently repeated (Bailey)_____SWAINSON HAWK

HHH Tail blackish with white bars; breast and shoulders rusty red _____RED-BELLIED HAWK

FF More than 30 inches in length; wing spread over 6 feet; base of tail white in young; legs feathered to base of toes; call, *kiah, kiah, kiah.* (Bendire) _____GOLDEN EAGLE

BBB Body white in color except for bluish wings and black shoulder patches; gull-like in appearance; call, a plaintive, musical whistle_____ _____WHITE-TAILED KITE

BBBB Breast and head white; black eye stripe; feeds on fish_____OSPREY

AA Owl-like flight; beating wings; tail blackish, crossed by 4 or 5 white bars; breast and shoulder rusty-red; frequents willows and trees near rivers and marshes; call, *yee-ak, yee-ak,* repeated rapidly in a high key (Bendire)__ _____(River Hawk) RED-BELLIED HAWK

AAA Beating flight; harrier habits (alternate, measured flappings and sailings); long, pointed wings.

I Tail white; breast white; hovers; gull-like; rare__WHITE-TAILED KITE

II Tail not white; white rump patch, narrow tail as long as body; flies close to ground when hunting_____(Mouse Hawk) MARSH HAWK

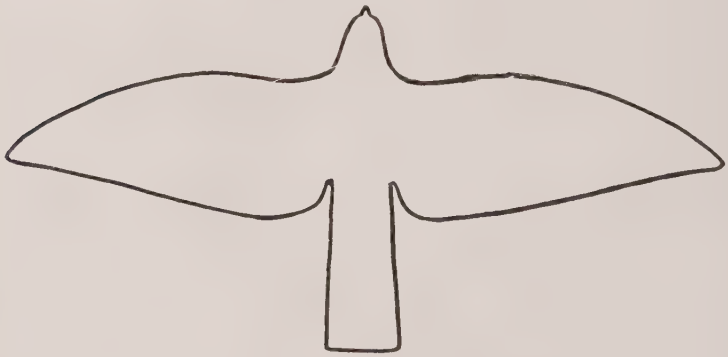


FIG. 47. Outline drawing of a marsh hawk, made from a freshly killed specimen, showing the long wings and tail which are characteristic of this hawk.

AAAA Dashing, darting pursuit flight, with alternating quick wing strokes and sailings in the open; long tail; no black markings under wings.

J Short, broad, rounded wings; barred tail; slender legs; no black bars on face; flight consisting of rapid flappings followed by a short soar; head comparatively small; seldom gives a call except when nest is disturbed.

K Length 11 to 13 inches; tail square; buoyant flight_____ _____(Bullet Hawk) SHARP-SHINNED HAWK

KK Length 15 to 19 inches; tail rounded; impetuous flight_____ _____(Blue Darter; Quail Hawk; Chicken Hawk) COOPER HAWK

KKK Length 22 to 24 inches; top of head black; conspicuous white stripe over eye; adult with barred breast and slaty blue wings_____ _____(Grouse Hawk) GOSHAWK

JJ Long narrow, pointed wings; black bars on face forming border to whitish throat; head comparatively large.

L Without white head.

M Length 15 to 19 inches.

N Found near water; powerful flight.____(Peregrine Falcon) DUCK HAWK

NN Found in open country of interior valleys; nests in cliffs; call a high pitched *keë, keë, keë* (Bendire)_____PRAIRIE FALCON

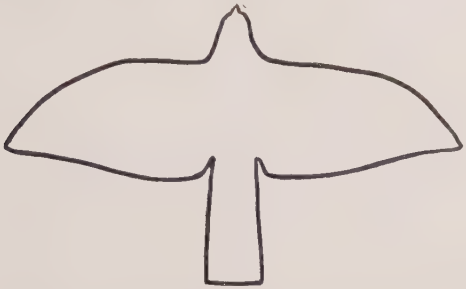


FIG. 48. Outline drawing of the sharp-shinned hawk, made directly from a freshly killed specimen, showing the short, broad wing and long tail usable as recognition marks with this and other accipitrine hawks.

MM Length 10 to 12 inches; slender build; reddish brown on back and tail; light under wings.

O Throat whitish; seldom hovers or soars; white throat patch; head large; speedy; back slaty-blue or brownish; darker in color than the sparrow hawk; rare in California_____(Merlin Hawk) PIGEON HAWK



FIG. 49. Outline drawing of a sparrow hawk, made from a specimen, showing the long slender wings and long tail which may be used as recognition marks for all the falcons.

OO Throat not whitish; hovering habit; no white throat patch; wavering flight; back grayish or reddish brown; tail of male reddish brown; top of fence post, telegraph pole or tall tree usual observation station; call, *killy, killy, killy, killy*_____(Killy Hawk) SPARROW HAWK

LL White head; dark back; white breast; extremely long slender wings; black eye stripe with white above the eye; found near water; often to be seen plunging after fish; call, *ki-ik, ki-ik- ki-ik* (Dawson)__(Fish Hawk) OSPREY

A SIZE KEY.

In order to avoid the more technical terms employed in the preceding key, which lays emphasis on the mode of flight, and to make possible identification of a perched bird at fifty yards, the following more simple key is offered. A combination of both the keys will doubtless give the best results.

Size Key to Vultures and Hawks.

Very large hawks—over 30 inches in length—wing spread over four feet.
Body black in color.
Head unfeathered like a turkey; carrion comprises food.
Large, 50 inches in length; white patch under wing_____(Condor) CALIFORNIA VULTURE

Smaller, 30 inches in length; no white patch; wing tips silver grey beneath _____TURKEY VULTURE

Head feathered, white in color; white tail (adult)_____BALD EAGLE

Body brown in color; found in mountainous country_____GOLDEN EAGLE

Medium sized hawks—20 to 25 inches in length.
White on rump.
Distinct white rump patch; long sharp pointed wings; found in and near marshes _____MARSH HAWK

White on each side of base of tail; broad rounded wings; legs feathered giving booted appearance; found in open country_____ FERRUGINOUS ROUGH-LEG

No white on rump.
Distinct black bar or bars on face.
Head white; found near large bodies of water_____OSPREY

Head not white.
Black bluish; usually to be seen near water_____DUCK HAWK

Black brownish; usually found in rough hilly country__PRAIRIE FALCON

No distinct black markings on face.
White stripe over eye; breast finely barred in adult; found in wooded country _____ GOSHAWK

No white stripe over eye.
Black shoulder patches; usually seen near marshes___WHITE-TAILED KITE

No black shoulder patches.
Tail long, barred with black.
Shoulder rusty red; usually seen in willows along streams_____RED-BELLIED HAWK

Shoulder not rusty red; found in wooded and brushy country—the real "Chicken Hawk"_____COOPER HAWK

Tail not long; fan-shaped in flight.
Dark band across breast; found in open country_____SWAINSON HAWK

No dark band across breast; the commonest large hawk_____ RED-TAILED HAWK

Small hawks—10 to 15 inches in length.
White patch on throat_____PIGEON HAWK

No white patch on throat.
Tail reddish brown; dark bars on face, the commonest small hawk_____SPARROW HAWK

Tail not reddish brown; dark bars on face indistinct, if any; found in wooded and brushy country_____SHARP-SHINNED HAWK

BIBLIOGRAPHY.

Bailey, B. H.
1918. The raptorial birds of Iowa. Iowa Geological Survey, Bulletin 6, pp. 1-238; 93 figs. in text.
Bailey, F. M.
1914. Handbook of the birds of the Western United States (4th ed. revised, Houghton Mifflin Co., Boston and N. Y.), pp. 1-570; 36 pls., 2 diag.; 601 figs. in text.
Bendire, Chas.
1892. Life histories of North American birds. United States National Museum Special Bulletin No. 1, VIII, pp. 1-446; 12 pls.
Bryant, H. C.
1913. The results of some miscellaneous stomach examinations. Condor, Vol. 15, pp. 92-93.
1918. Evidence on the food of hawks and owls in California. Condor, Vol. 20, pp. 126-127.
1921. Red-bellied hawk eats caterpillars. The Condor, Vol. 23, pp. 65.
Coues, E.
1903. Key to North American birds. (5th ed. Dana Estes & Co., Boston), 2 vols., pp. 1-1152; illus.
Dawson, W. L. and Bowles, J. H.
1909. The birds of Washington. (Occidental Publishing Co., Seattle, Washington), 2 vols., XV, pp. 1-997; 44 pls., 300 figs. in text.
Dixon, Joseph.
1906. Land birds of San Onofre, California. The Condor, Vol 8, pp. 91-98.
1917. Control of the California ground squirrel. University of California Agric. Exp. Sta. Circular 181, pp. 1-16.
Fisher, A. K.
1893. The hawks and owls of the United States in their relation to agriculture. United States Dept. of Agric., Div. Orn. and Mam. Bulletin 3, pp. 1-210; 25 pls.
1907. Hawks and owls from the standpoint of the farmer. United States Dept. of Agric., Biological Survey Circular 61, pp. 1-18.
Forbush, E. H.
1916. The natural enemies of birds. Mass. Bd. of Agric. Econ. Biol. Bulletin 3, pp. 1-58; 5 pls., 5 figs. in text.
Fuertes, Louis Agassiz.
1920. American birds of prey—a review of their value. Nat. Geog. Mag., Vol. 38, pp. 460-467; 2 pls., 4 figs. in text.
Grinnell, J. and Swarth, H. S.
1913. An account of the birds and mammals of the San Joaquin area of southern California. Univ. of Calif. Publ. Zool., Vol. 10, pp. 197-406, pls. 6-10; 3 figs. in the text.
Howell, A. B.
1917. Birds of the islands off the coast of southern California. Pac. Coast Avifauna, No. 12, pp. 1-127.
Nichols, John T.
1920. Character sketches of hawks. Forest and Stream, Vol. 90, pp. 70-71.
Nicholson, G. and Pierce, W. M.
1921. Duck hawk wintering in Ontario. The Condor, Vol. 23, p. 99.
Oberholser, H. C.
1906. The North American eagles and their economic relations. U. S. D. A., Bur. Biol. Survey Bulletin 27, pp. 1-31; 2 pls., 2 figs. in the text.
Pierce, W. M.
1919. Miscellaneous stomach examinations. The Condor, Vol. 21, p. 127.
Sharp, C. S.
1906. Nesting of the red-bellied hawk. The Condor, Vol. 8, pp. 144-148; 2 figs. in the text.
Taverner, P. A.
1918. The hawks of the Canadian prairie provinces in their relation to agriculture. Canada Dept. Mines, Geol. Survey Museum Bulletin 28, pp. 1-18.
1919. Birds of eastern Canada. Canada Dept. of Mines Museum, 104, pp. 297, 50 colored pls.
Townsend, Chas. W.
1919. The identification of hawks in the field. Essex Co., Orn. Club. Bulletin 1, pp. 1-4; 3 figs. in the text.
Tyler, John G.
1913. Some birds of the Fresno district, California. Pac. Coast Avifauna, No. 9, pp. 1-114.

A ROYAL SILVER TROUT CAUGHT IN LAKE TAHOE.

By J. O. Snyder, Stanford University.

Two skillful anglers, Dr. Ross Harbaugh and Mr. R. L. Handy, who regularly visit Lake Tahoe, report the not altogether infrequent capture of the royal silver trout, a species lately named *Salmo regalis.* That no mistake might be entertained as to their ability to distinguish the species a fine specimen was sent for determination to Stanford University where it was first described. This is the fifth specimen that has come to the hands of a naturalist, and data obtained from it is of great value in assisting to build up a description of the species. Unfortunately, it was eviscerated and nothing may be said of the sex, gillrakers, stomach caeca, etc.

The fish, caught one mile off Bijou, weighed 6½ lbs. and measured about 25 inches. It was greenish blue above, bright silvery on the sides and whitish below. There were a few very indistinct round spots on the head and on the sides below the lateral line. The fins were immaculate. This was a larger example than those originally described* and the head and fins were somewhat shorter.

The following measurements are recorded in hundredths of the length to base of dorsal fin. Length head .20, depth body .215, depth caudal peduncle .095, length snout .062, maxillary .11, diameter eye .03, interorbital width .08, depth head .14, snout to occiput .124, snout to dorsal .455, snout to ventral .54, height dorsal .11, height anal .11, length pectoral .13, length caudal .165. Number dorsal rays 11, anal 11, pectoral 14, scales lateral series 145, above lateral line 20.

There is no reason for confusing this species with any of the introduced forms as the Mackinaw trout for example, but it may be mistaken for silvery examples of the Tahoe trout *Salmo henshawi,* concerning which some remarks may not be out of place here. This is the commonly distributed trout of the greater part of Nevada and of the western slopes of the Sierra Nevada mountains, and it reaches its largest size in the Truckee basin.

This basin includes the Truckee River, Lake Tahoe and tributary streams which form its source, and Pyramid and Winnemucca lakes into which the river flows, and where its waters are finally carried off by evaporation. This basin, none of the water of which reaches the ocean, offers far greater environmental variations than is usual among much larger systems, and the trout seemingly react in a medley of colors, and assume a variety of minor characters such as are not often observed among individuals of a single species.

Many anglers distinguish trout by color and body proportions, and those that fish in the Truckee basin usually recognize several native kinds. First and most commonly known is the Tahoe trout with light olive body and an array of large black spots well scattered over almost the entire surface. Examples in the nuptial dress seen in the spring and early summer have metallic reflections shining through the body color, a broad pinkish stripe on the sides, and a scarlet patch on the cheeks and above the axil of the pectoral fin. The under surface of the lower jaw has two parallel stripes of bright red, and there is a spot of

*Bulletin Bureau Fisheries, Vol. XXXII, 1912.

red on the tongue beneath the tip. One or more bright coin-like spots of orange may be found anywhere on the head. Then there is the silver trout of Lake Tahoe, large in size, silvery in color, with many small narrow spots on the body and fins. It is usually caught in deep water. The royal silver trout not known to some anglers, blue or greenish blue above, silvery on the sides, with very small or not evident spots, might be mistaken for the above. The Truckee trout is the resident fish of the river. It is usually smaller and more brightly colored than the Tahoe trout. Another is the redfish remarkable for the great flame-red patch on the cheek. It is a migrant from Pyramid and Winnemucca lakes, entering the lower Truckee River to spawn. Also there is the tommy, a more modestly colored and smaller fish which enters the lower course of the Truckee to spawn. Finally, the emerald trout of Pyramid Lake which is pale green above, silvery on the sides and with indistinct spots or none. This fish does not enter the river to spawn.

Observation of these fish has convinced the writer that but three species are involved. There are the royal silver trout of Lake Tahoe, *S. regalis* and the emerald trout *S. smaragdus* of Pyramid Lake. These are alike in some respects, and both differ from all the others mentioned in having coarser scales, 124 to 145 series between the head and base of caudal fin. They also have fewer gillrakers and other distinctive characters. As each is confined to its particular lake there is no occasion to distinguish between them, as there is no opportunity to mistake one for the other. The others, the Truckee trout, redfish, tommy, silver and Tahoe trout, all belong to one species, *S. henshawi*. The latter has fine scales, counts of a large number indicating 153 to 163 as usual while a few have as many as 170.

Of these local varieties the redfish and tommy are perhaps the most remarkable, appearing as they do in two great waves of a nuptial migration which passes up the lower Truckee River with the rise of water due to winter rains. Formerly these trout were so abundant as to fairly fill the river at times. The redfish appear first, and as they progress from the lakes their brilliant hues become intensified in the bright desert sun until the whole body shines with iridescent yellow, vermillion and red, the cheek glowing like a coal of fire. The redfish migration wanes rapidly in March, the scouts of the tommies appearing mingled with the last straggling redfish, the more belated of which are lost among the advancing hordes of tommies. The tommy, the name taken from the Piute word tama-agaih, spring trout, is smaller, generally darker in color, and more heavily spotted than the redfish. Silvery tommies and redfish appear late in the season, possibly individuals fresh from the lake.

It will be recalled that the water of Pyramid and Winnemucca lakes is rather alkaline, not fit to drink, yet it supports great numbers of fish. We have here migrations of trout from the lake to the river, like those of steelheads from the ocean. It has often occurred to the writer that observations on the trout of this rather restricted basin might form a sound preparation for a more extended attack on the difficult problems offered by trout of much wider distribution.

THE NEW CALIFORNIA STATE FISHERIES LABORATORY*

By Will F. Thompson.

On June the thirteenth, construction began upon the new California State Fisheries Laboratory at San Pedro, the most important of our fisheries centers. It is to cost in the neighborhood of twenty-five thousand dollars, and will accommodate the present scientific staff of the Department of Commercial Fisheries. The conceptions which gave rise to its building are novel and worthy of remark at this time, for it is not generally known that this project is a distinct and noteworthy departure, a fact which Californians should know and appreciate.

The building will be located near Fish Harbor, San Pedro, within two blocks of the canneries there—with easy access to the vast store



Fig. 50. Elevation of new State Fisheries Laboratory being built at San Pedro.

of fish which is brought into them. The site has been granted to the Commission for a long period by the city of Los Angeles, and its acquisition has been a very fortunate thing. It is at the intersection of Seaside avenue and Tuna street, hence upon the two most important traffic ways in East San Pedro. Seaside avenue will, in the course of a few years, be connected with a boulevard to Los Angeles, through Wilmington and Long Beach. Tuna street, which is but a very short one, terminates upon the water front of Fish Harbor in the center of the canneries. The new building for the San Pedro office of the Commission will be built upon the same plot of ground, of the same type of architecture and will face upon Tuna street.

The laboratory building will be nearly fireproof, of reinforced concrete, with tile partitions and red tile roof. A perspective view of it

*California State Fisheries Laboratory Contribution No. 29.

is given in figure 50, and the floor plans are shown in figure 51.* There are two stories. The lower contains two laboratories capable of accommodating several workers, with windows facing nearly north and hence with splendid light for scientific work. It has also a large workroom, floored with cement and with a door through which a truck may enter. There are also a dark room for photographic work and a store room for supplies. The upper floor contains a large room to accomodate the extensive and highly technical library necessary in the work of the laboratory, as well as the files of statistical records which will accumulate. In connection with this room is a laboratory and another smaller room, the latter also destined for statistical files. A bedroom is provided for the accommodation of the student workers who may be employed.

The purpose of this building is to provide quarters for the present scientific work of the commission, the aims of which have been previously stated in CALIFORNIA FISH AND GAME, but which are well deserving of brief recapitulation in this connection since they are in a measure distinct from those of any other biological laboratory, especially of any in America. They are, in the fewest possible words, the observation of the condition of the fisheries with a view to their preservation and freest possible use. That is, true conservation.

The real abundance of fish in the sea is not obvious to whoever may look. A fishery may languish because of changing natural conditions, despite untouched abundance of fish; or, on the contrary, constantly improved apparatus may yield larger and larger returns in the face of real over-fishing. A fishery is, indeed, highly selective in its action and dependent on many things other than the real abundance of fish. So it happens that "observers" of the highest scientific standing casually contradict each other as to the existence of depletion and the inexhaustibility of the sea. Is it any wonder, then, that the alleged criminal "exploitation," brought before legislative tribunals, pleads—as does the murderer at the bar—that his life be not taken without proof? For opinion, backed by scant evidence, is not proof, and "exploitation" does furnish food for the nation and is respectable, wealthy, and of good reputation generally. Opinions do have a great deal of force where, as in the case of conservation of birds and mammals, mere observation in the field is convincing to any fair-minded person, but in the case of marine fisheries this is not true.

So, in place of opinion, the real conservationists—and among these are many of the commercially interested men—must endeavor to furnish what is tantamount to legal proof. Such men as have composed the Scottish Fishery Board—men who have patiently and carefully examined into the condition of various fisheries—have proved the existence of depletion in several of these fisheries, and have demonstrated the character of data necessary, and we have profited by their experience. These data are statistics, so detailed, so extensive, and so accurately gathered that changes in gear, changes in fishing ground, and many other things may be discounted. Such data must also be examined and tested by the biologist with his criteria of over-fishing. To give such

*By courtesy of the State Engineering Department, the floor plans modified by Mr. Higgins for purposes of reproduction.

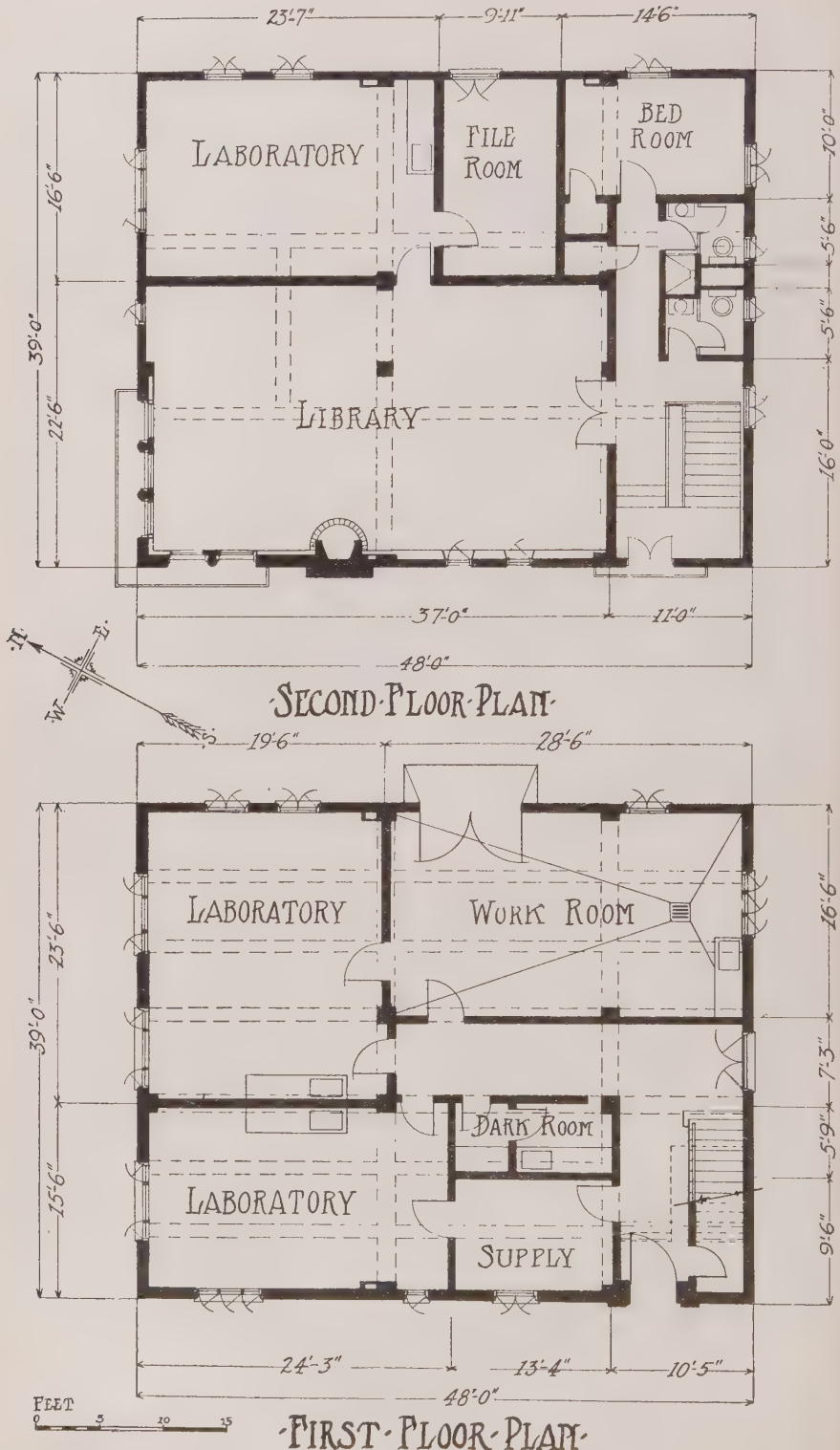


FIG. 51. Floor plan of new State Fisheries Laboratory being built at San Pedro.

proof as these data provide, is the purpose of the new laboratory. It is for the digestion and biological analysis of statistics.

Until such is done neither can exploitation proceed freely, nor may we be sure that over-fishing will not go so far as to be irremediable. There is, after all, no method for knowing how much strain a fishery will endure save by trying it, and this implies the duty of careful observation. That duty rests with the government in legal control of the fisheries and their machinery of exploitation.

The Fish and Game Commission has, in California, a system of statistics entirely suitable for such analysis. That now in use is without parallel in any country or state, to the best of our knowledge, and forms a wide and firm basis for true conservation. It is not based on estimates, volunteered information, nor inquiry, but is an actual record of the commercial transactions which take place between fisherman and dealer. This record is from carbon copies of the fisherman's receipt upon which he receives his money, and is far more probable to be correct, naturally, than any other record obtainable. It has actually provided many of the fresh-fish dealers with a record of their transactions for the first time. With all its faults—which those concerned with its administration are prone to magnify rather than ignore—so much light has been thrown upon the returns formerly obtained by inquiry and circulated questionnaire, that we regard them as of small value in comparison with what we now get.

But in addition to the high degree of accuracy, it is now possible to follow the catches of single boats from year to year, and thus to accurately compare the abundance of fish from day to day and from year to year. And it is the interpretation of the statistics from the standpoint of changes in abundance—including depletion—to which the new laboratory will be mainly devoted. The distinction between the effects of over-fishing and those of hydrographic or economic changes, and the explanation of the latter, imply the careful analysis of statistics from a mathematical and biological standpoint. It will be the function of the new laboratory to contribute toward that end, and toward the formulation of whatever knowledge exists. Such a function, it should be noticed, is based primarily upon the legal control of the state over its fisheries, and upon its power to enforce the gathering of statistics—thus assuring, we believe, the permanency of the work.

Finally, attention might be called to the fact that the vast quantity of material handled by the commercial fisheries provides an unequalled opportunity for the solution of many of the major problems of biology. We trust that the laboratory will make its contributions to those as well as to the more immediate ends.

To the proper furtherance of the aims we have outlined above, the statistical files from the state will be placed in the new laboratory, where they will be—in accordance with the law—safe from damage and accessible to investigators.

It has been realized, however, that to secure proper support for the work in hand, an exhibit open to the public will ultimately be necessary. The results obtained, the facts known about our fisheries and those of other countries, must be presented graphically and attractively. So it is planned at some time in the future to add a large, well-lit exhibit room on the southern face of the new building, between the laboratory and the new office quarters.

AN IMPORTANT DECISION ON THE FISHWAY LAW.

The Anderson Cottonwood Irrigation District is a political subdivision created under the provisions of the Irrigation Act.

The district constructed a dam across the Sacramento River above the city of Redding, Shasta County, which prevented the passing of fish up the Sacramento River. Under the provisions of section 637 of the Penal Code the district was served with a notice to construct a good and sufficient fishway over said dam.

The district refused to comply with the order and on December 20, 1920, injunction proceedings were begun against the district by Hon. Jesse W. Carter, district attorney of the county of Shasta and an application made by him for a temporary injunction restraining said district from operating said dam.

The hearing on the temporary injunction was set for January 7, 1921, before the Hon. Eugene P. McDaniel, judge of the superior court. Defendant Anderson Cottonwood Irrigation District filed a demurrer and on January 7, the matter was argued and submitted and on May 19, 1921, Judge McDaniel rendered his decision, a copy of which follows:

In the Superior Court of the State of California, in and for the County of Shasta

THE PEOPLE OF THE STATE OF CALIFORNIA, *Plaintiff*, vs. ANDERSON-COTTONWOOD IRRIGATION DISTRICT, A BODY POLITIC AND CORPORATE AND W. F. SMITH, CHARLES HAMPTON, CHARLES SPANN, W. A. BROWN AND EARNEST SCHULER, AS DIRECTORS OF SAID ANDERSON-COTTONWOOD IRRIGATION DISTRICT, *Defendants*.

The complaint in the above entitled proceeding, after the statement of necessary formal matters, alleges that the Sacramento River is frequented by a great number of salmon and is regularly stocked with salmon by the Fish and Game Commission of this state; that the upper reaches of said river above Redding are the natural spawning grounds of said salmon; that the defendants have constructed, operated and maintained across the entire width of the river at the city of Redding, a dam for the purpose of diverting the waters of the river into the main canal or ditch of the defendants; that said dam constitutes an obstruction in the river which prevents the free passage of salmon over, through, by or around said dam, and that by reason thereof, said salmon are prevented from reaching their natural spawning grounds and thus prevented from propagating, reproducing and replenishing the river with salmon, which are alleged to constitute one of the valuable natural food supplies of the people, of great monetary value; and that unless the obstruction is removed, said salmon, by reason of their inability to reach the spawning beds annually and reproduce themselves, will be shortly and ultimately exterminated, to the great and irreparable loss, damage and injury to the people of California; that the maintenance of said dam by defendants is in violation of the rights of the people and constitute a public nuisance; that defendants threaten to maintain, and unless restrained by the court, will maintain the dam to the plaintiff's irreparable injury.

Following, the complaint then prays:

1. For a permanent injunction against defendants to enjoin and restrain the maintenance of said dam across the river and from obstructing the river so as to prevent the free passage of salmon;

2. That defendants, upon an order to show cause, be enjoined *pendente lite*.

Defendants have demurred on general grounds to said complaint and have made return to the order to show cause, and support said return by a number of affidavits. Upon the hearing testimony was received from witnesses for both parties upon a stipulation that the testimony should be transcribed and considered as affidavits upon the consideration of the said application for an injunction *pendente lite*.

The defense contends: 1. That an adequate fishway has been provided in its dam;

2. That the irrigation district is a political subdivision of the state, exercising a function of the state government;

3. That the injunction, if granted, would prevent the execution of a public statute by officers of the law for the public benefit;

That the injunction cannot be granted to prevent the execution of a public statute by officers of the law for the public benefit; and that nothing which is done or maintained under the express authority of the statute can be deemed a nuisance;

4. That in this proceeding, under the facts shown by the affidavits and testimony on the part of the defendants, estoppel against the state has been established;

That the dam in question is under the authority of the Department of Engineering, and not the Fish and Game Commission.

5. That by the enactment of the California Irrigation District Act, the state has not only waived its property rights in the stream by implication, but has, by the provisions of section 56 of the act, expressly granted such rights to the district.

Some of the foregoing matters were presented in support of the defendants' demurrer to the complaint, and nearly all of them were urged in support of defendants' opposition to the issuance of a temporary restraining order.

It is not necessary for this court in a long opinion to review the many authorities cited in the exhaustive and able briefs of respective counsel. Only those authorities will be cited which are necessary to notice as support for the court's conclusion upon the issues.

The demurrer will first be disposed of. In my opinion the facts stated in the complaint are sufficient to constitute a cause of action, and when conceded to be true, as they must be on demurrer, show such an obstruction of the free use of property as to interfere with the comfortable enjoyment of life and property, not only by an entire community and neighborhood, and a considerable number of persons, but by all the people of the State of California.

People vs. *Truckee Lumber Company,* 116 Cal., 397;
Yolo Water and Power Company, a corporation, vs *Superior Court,* Vol. 30, C. A. D., 3.

The last above cited case in my opinion disposes of several of the defenses of the defendants herein, in as far as those defenses bear upon the demurrer. It holds that the superior court has jurisdiction to hear and determine a suit brought in the name of the People of the State of California, against a public utility to enjoin it from committing a public nuisance.

This case is also reported in 185 Pac. 195, and seems to be the latest expression of our courts as to the right to maintain a suit against a public utility for the abatement of a public nuisance by an injunction. It is my conclusion, therefore, that the demurrer should be, and it hereby is overruled.

The testimony produced by the respective parties in affidavit form and that orally received by the court from the witness stand was irreconcilably conflicting. That on the part of the defendant controverted or at least attempted to controvert every material averment of the complaint as to the creation of the public nuisance in question.

In view of the conclusion reached as to the issuance of a temporary restraining order, it will be unnecessary at this time for the court to decide some of the contentions, for instance the matter of estoppel *in pais* urged by the defendant. However, the opinion may be expressed that there was not sufficient evidence on the part of the defense to establish any estoppel as against the plaintiff.

The general laws of the state, particularly those of the Penal Code, furnish ample authority for providing adequate fishways over dams and artificial obstructions. The California Irrigation District Act furnishes ample authority for the building of obstructions and dams in the streams of California for the purposes of irrigation; but there is no necessary conflict, implied or otherwise, in the statutes relating to these matters, nor any adequate reason for any clash of authority between different state agencies in enforcing all the laws.

It was never the intention of the Legislature, in enacting the irrigation law, to permit irrigation districts to destroy the fishing interests of the state, nor was it its intention to permit the penal laws to operate in such a way as to prohibit the construction of necessary works needed for the development of vast irrigation projects. These laws must all be given a reasonable interpretation and so carried out and enforced as to avoid unnecessary conflict, and so that all of the varied interests of the state may be conserved. The plaintiff herein seeks not the destruction of the dam across the Sacramento River, but only desires to prevent its maintenance in such a manner as to bring about the destruction of the fish in the stream.

In my opinion, there is little merit in the argument that this proceeding is an attempt to interfere with the operation of any public statute.

The testimony for both parties on the hearing shows that the dam in question is at most not to exceed fifteen feet in height and it therefore undoubtedly is true that it is reasonably possible to construct an adequate fishway over, by or around the said dam, if the opening now existing in the middle of the dam, as a matter of fact, be an inadequate fishway or no fishway at all, which is the big question in the case.

Upon that question, as noticed before, there is so far such conflict as to require in its determination a decision upon the merits of the whole case. While it would seem that perhaps enough testimony was received by the court to enable it to resolve the conflict, I feel sure that there would be grave danger of error and injustice by its determination at this time. Witnesses for the plaintiff of reputable character in all respects testified to facts indicating that it is a practical impossibility for spawn-laden fish to pass through the twelve foot opening in defendants' dam during the running season to the spawning grounds. In opposition, equally reputable witnesses on behalf of defendants swear positively that such salmon readily pass up the river

through the said opening. One witness declares he observed as many as ten salmon pass up and over the dam through the opening in five minutes.

The court is astonished there should be such a conflict on a question capable of actual demonstration. It should be easily determined by ocular investigation during the fish running season. When the matter is fully at issue, the hearing may be brought on before the court during the spring or fall run of salmon; if respective counsel and the court will arrange to have the suit heard at such a time, then in addition to hearing witnesses testify, the court, if it saw fit, could actually go to the dam and there by observation and examination, learn the real facts.

While now satisified that it is probable that there is a serious obstruction to the free run of salmon and grave danger of depletion in the number of salmon reaching the spawning grounds, with consequent injury to a renewal of the supply, the court is not now satisfied that there is danger of irreparable injury; at any rate, irreparable injury greater in estimation than might result to the defendants and to the people at this time, if the defendants should be compelled, by a mandatory injunction, to make a larger opening in the dam, as the irrigation season is almost at hand and defendants' supply of water might be cut off by the issuance of such injunction *pendente lite*.

Upon the authority of the cases cited by defendants' counsel, viz., *Gagliardo* vs. *Crippen*, 22 Cal. 362, and *Schwartz* vs. *Arata* et al., Vol. 31, C. A. D. 265, 188 Pac. 313, it clearly is a matter of discretion with the court whether to issue the injunction or not, and in view of the foregoing considerations, in my opinion, no injunction should be issued until the case is heard upon its merits.

To recapitulate: 1. It hereby is ordered that plaintiffs' motion for a temporary restraining order or injunction *pendente lite* be and it hereby is denied.

2. It hereby is ordered that defendants' demurrer to plaintiff's complaint be and it hereby is overruled, with leave to defendants to file their answer within ten days.

Dated: May 19, 1921.

(Signed) EUGENE P. MCDANIEL.
Judge Presiding.

This is a most important decision upon the law of fishways for there is no doubt that when a trial is had on the merits of the case it can be shown that the dam in question is such an obstruction to the free passage of salmon that unless a good and sufficient fishway is constructed it will completely exterminate the run of salmon on the Sacramento River, its tributaries, McCloud and Pitt, and other streams.

CALIFORNIA FISH AND GAME

A publication devoted to the conservation of wild life and published quarterly by the California State Fish and Game Commission.

Sent free to citizens of the State of California. Offered in exchange for ornithological, mammalogical and similar periodicals.

The articles published in CALIFORNIA FISH AND GAME are not copyrighted and may be reproduced in other periodicals, provided due credit is given the California Fish and Game Commission. Editors of newspapers and periodicals are invited to make use of pertinent material

All material for publication should be sent to **H. C. Bryant, Museum of Vertebrate Zoology, Berkeley, Cal.**

JULY, 1921.

A HAWK NUMBER.

This number contains an article designed to interest our readers in the conservation of hawks. Beneficial hawks, because of deeds committed by a few relatives, have received much persecution at the hands of farmer and sportsman. Being large conspicuous birds and with a slow rate of increase they have suffered more than others; some species have been practically exterminated. The Condor, or California Vulture, is now one of the rarest birds in the state and the White-tailed Kite is approaching extinction. Neither can be considered injurious species. In addition to a discussion of the economic value of the various species of hawks based on California data, there is added a field key which it is hoped will be found useful by those desiring to distinguish the beneficial from the injurious hawks. An attempt has been made to use characters helpful in field identification rather than those useful with a bird in the hand.

SOME OF THE IMPORTANT CHANGES IN THE LAWS AFFECTING GAME.

A number of important changes were made in the seasons for taking game, at the 1921 session of the state legislature.

The deer season in the Sierra districts and also in Humboldt, Del Norte and Siskiyou counties will not open until September 1 and will close October 15. In southern California the season will not open until September 16 and will close October 15. In the coast districts the season will be the same as last year, opening August 1 and closing September 14.

Ducks, geese, brant, jacksnipe and mudhens may be killed from October 1 to January 15.

The most radical change was the creation of practically a blanket season on all species of quail. Heretofore, mountain quail could be taken in the Sierra districts September 1; under the new law the season will not open (except in Del Norte, Humboldt and Siskiyou) until November 1 and will close January 15. In the counties mentioned quail may be taken between October 15 and December 15. The same season for taking quail will apply to cottontail and brush rabbits, November 1 to January 15.

Sage hen may now be taken from August 1 until September 15. This will give an opportunity to take young birds before the flesh has become strong from sage. In district 4½ sage hen cannot be taken at any time of the year.

The change in the trout law delaying the opening of the season one month in the principal districts will give much better fishing within the next few years. Trout have not finished spawning by the first of April and if the supply of fish for the greatly increased number of anglers is to be kept up, breeding fish must be given every opportunity to spawn. Under the new law the season will be open from May 1 to October 31 in districts 1, 1½, 2, 3, 4 and 4½. A new district was made in the western part of Mendocino County consisting of that portion of the county draining direct into the Pacific Ocean. In this district, known as 2½, the trout season will be open from July 1 until Febraury 14. The season in the Tahoe and other smaller districts will be the same as last year.

Another important provision in the trout law is the reduction of the limit to 25 fish per day. This will be a great help in keeping California streams filled with trout. Added protection is given trout and other game fish by a new section numbered (632 a) and by an amendment to the section referring to night fishing and hunting. Section 632a prohibits the placing of any obstruction in any stream that will impede in any way fish from making their way up and down stream.

The other section provides that no game fish may be taken between one hour after sunset and one hour before sunrise.

The section prohibiting hunting in game refuges was amended so as to prevent the possession of game or fire arms in any refuge except under permit from the Fish and Game Commission.

SUMMER RESORT WORK TO BE CONTINUED.

Several years ago the Fish and Game Commission began carrying their educational campaign into the summer resorts where it was found that people were particularly susceptible to information concerning fish and game and wild life conservation. It was found also that a large number of people could easily be reached in a short length of time. Under urge from the National Park Service an intensive educational campaign was undertaken in Yosemite National Park, under the title "Nature Guide Service." Thousands were taken on trips afield gaining first hand information of wild life and over twenty-six thousand persons attended camp-fire talks and illustrated lectures given by the nature guides.

This work is to be continued in Yosemite during the summer of 1921, the Fish and Game Commission sending their educational director, Dr. H. C. Bryant, to take charge of the work. Dr. L. H. Miller, of the Southern Branch of the University of California, will share in the work and other assistants have been provided. Nature study libraries and exhibits showing the work of the Commission form a part of the program. "To read nature as one reads a book" is the motto followed. Certainly, work of this kind is of great service in building a public sentiment favorable to wild life conservation.

ARE BAG LIMITS TOO LARGE?

Consideration of present day game laws and the need for more restricted bags leads one to question the advisability of continuing to allow each hunter to have a separate bag limit on the various species of game. Why should a man be allowed twenty-five ducks, eight geese and twenty-five snipe in a single day should he be able to secure them? Or why should the law allow the upland hunter fifteen quail and fifteen doves in one day? Certainly, such bags would be far more than a man could utilize himself or advantageously give away.

The day is not far distant when bag limit laws will be effective regardless of species. Fortunately, there is a tendency among hunters to limit their kill to the number of birds they can utilize, and consequently, such a law would only curtail the game hog.

DUCK HUNTING FROM AN AIRPLANE

There has been considerable discussion and consequent investigation concerning the protection of the rice fields from the depredations of ducks. In 1919, it was decided that the most effective methods of control were to be obtained by herding and bombing, and the government solution of the problem appeared satisfactory to the growers.

Since then a good deal of publicity has been given the method of protecting rice crops by airplane duck patrol. The Standard Oil Bulletin, November, 1920, states that: "last year an aeroplane patrol was established as an experiment. It worked so well that this season it was repeated, and now five planes are kept busy, making both day and night flights to frighten off the wild ducks."

The American Game Protective Association makes the following criticism:

"We have been told that permits were granted to the rice growers of California to use aeroplanes to frighten the ducks from their growing crops. This appeared to us to be a very good idea, as efforts to frighten birds away from growing crops by gunfire has never accomplished the results desired, and is nearly always used by unscrupulous gunners as an excuse to shoot out of season. However, if aeroplanes under permits of this kind are actually killing birds, such permits should be immediately revoked."

Last fall a motion picture was shown over the country of one of these hunts, and at the same time, pictures appeared in the Sunday news supplements which showed that many birds were slaughtered by being hit with the propeller and other parts of the machine. The projection of the motion pictures was discontinued when it was learned that this picture was causing many protests, and that investigations

were being made to ascertain where the pictures were taken. The supposition seems to be that it was photographed in California, and that the airplane was operated by an army lieutenant from Cressy Field. If this proves to be the case, certainly some immediate provision should be made to protect the migrating waterfowl and to prevent a glaring violation of the Migratory Bird Treaty Act. The state law prohibits the shooting of game birds or mammals from an airplane, but does not definitely provide against ruthless slaughter by propeller and guy wires.



FIG. 52. Airplane routing ducks from the rice fields. Photograph by L. V. Halbrook, special Standard Oil agent at Willows, California. Courtesy of the Standard Oil Company of California.

SALMON DEPLETION IN BRITISH COLUMBIA.

During the war there was a noticeable dependence upon the results of scientific research. It is becoming more and more evident that more dependence can be placed upon conclusions of men who have scientifically investigated a problem than upon the guesses of the untrained worker. We have seen no better example of this change in attitude than in the recent reports regarding the prospective take of salmon in British Columbia during the coming season. Even the "British Columbia Financial Times," a journal of finance and commerce, has published in full the report of Dr. C. H. Gilbert, of Stanford University, who points a dark future of the salmon run in the Fraser River. He offers the ominous prediction that "big years" are wholly a thing of the past. The same article accompanied by an editorial appears in the "Canadian Fisherman," (March, 1921). On the basis of the findings of this scientist also, the American Can Company is planning to furnish only one-third of the number of cans usually supplied the canneries of this section.

Thus it can be seen that the predictions of a scientist bear more weight than those of the average fisherman who would predict, on the basis of past cycles, another splendid season for the year 1921.

In Dr. Gilbert's article, "The prospects of Fraser River sock-eye run in 1921," he states that two entirely independent lines of evidence had pointed to a greatly decreased run of salmon in 1917. One of these was the blockade of the Yale Canyon in 1913, which was just in time to

intercept the spawning run of that year —due to be a "big year," for prior to 1917, a big year occurred without fail in every fourth season. In 1917, a pack of 560,000 cases was produced, little more than one-fifth the pack of the big year of the previous cycle.

It is known to all packers and fishermen that the year before the large run was always made conspicuous by the occurrence of large numbers of greatly undersized individuals—male fish—which evidently constituted a class apart from the main body of the run, and which in the small years of each cycle were rarely encountered. The packers put up these fish separately because they contained less oil and were paler in color, as an inferior grade. They were thus in a position to compare their abundance in the years of their occurrence with that of four or eight years previously. From observations made, it came to be currently believed that whenever the number of small fish was relatively large then the big year which followed would be correspondingly increased in comparison with other big years. Then it became further known that the "usual run of sock-eyes to the Fraser were maturing the fourth year of their age, while these undersized males—or grilse, as we call them —were maturing in their third year; and they would therefore make their appearance in the run one year earlier than would the four-year fish which resulted from the same spawning. If, then, the spawning of the last big year had been an unusually successful one, this might be expected to result in an exceptionally large run of grilse three years thereafter, and an equally exceptional run of the four-year fish which would constitute the big run of the following year. The number of three-year grilse in the year before the big year might well, therefore, give a clue to the probable size of the big year itself."

For this year, the same two lines of evidence are available. The data derived from the numbers of grilse, which made their appearance, and the success of the spawning fish of the three and four-year cycles, both point to a definitely worse condition for 1921.

Careful study and investigation which began in 1911 has satisfactorily determined this conclusion, and Hon. Wm. Sloan, Commissioner of Fisheries for the Province of British Columbia, is quoted as having said, "Dr. Gilbert's paper must, I think, impress the fishing interests of the state of Washington of the necessity of prompt action, and that the methods that must be adopted to reestablish the runs to the Fraser, which in former big years were so profitable to them and our own interests, will be equally successful in restoring the runs of the lean years."

CONSERVATION AND THE SCIENTIFIC COLLECTOR.

For several years past there has been a tendency in many states to restrict the scientific collector of bird specimens and eggs. In some states, the privilege of scientific collecting has been entirely prohibited. Since practically all useful information regarding wild birds and animals is a result of the acquisition of specimens, the necessity for work of this kind is evident. The curtailing of scientific collecting must result in decreased scientific information. Furthermore, there is the danger of decreasing the number of ornithologists by cutting off the opportunity for the right sort of study. Our best ornithologists owe their early interest and their development largely to the unrestricted chance for securing specimens.

We have grave doubts as to the wisdom of tightening up on those who are solely interested in birds from the scientific point of view. We cannot understand from whence comes the pressure which forces government officials or state officials to further restrict the collector. Certainly, such restriction cannot be considered an important conservation measure, as compared with other measures. Compare the effect on the species wrought by the sportsman and that by the work of the scientific collector. The sportsman is allowed twenty-five ducks in a single day and fifty per week. There are no collectors in California, even including public museums, who add twenty-five specimens of ducks to their collections in a whole year. Note also that the sportsman concentrates his attention on a few species of game birds, taking a large toll, whereas, the scientific collector obtains protected song birds largely, on which there is no concentrated hunting and

where the toll is respectively very small on any one species. There are about one hundred and fifty scientific collectors in California as contrasted with more than one hundred and eighty thousand hunters. Hardly one of these collectors hunts for sport. Specimens of eggs taken do not represent, as a rule, a lessening in the annual increase of a species, for a second clutch of eggs is nearly always laid. Conservation is not hindered but advanced.

The test of legitimate collecting should be placed upon the spirit of the collector, and so long as he demonstrates that his interest is in a scientific study of wild birds and animals and that he can contribute to science, he should be encouraged rather than discouraged.

POWER PROJECT HEARING.

An important hearing on the project for the building of a large dam on the Klamath River was held at Yreka on May 12. The Federal Power Commission delegated F. H. Fowler, district engineer of the United States Forest Service, as chairman. The protestants represented were the Shasta Valley Irrigation District, Yreka Chamber of Commerce, and the Fish and Game Commission.

The certain destruction of the salmon run in the Klamath River, as a result of the proposed power project, has led the commission to oppose the undertaking. Dr. J. O. Snyder, of Stanford University, acting as a fishery expert for the commission, pointed out that two species of trout, in addition to the salmon, would be ultimately destroyed, if prevented from reaching their breeding grounds. He also pointed out that the salmon when they reach the lower part of the river are unripe and that spawning operations under such conditions would be practically impossible.

Residents along the Klamath River pointed out the value of the river as a spawning stream. The contemplated new road from the coast to Yreka will open the stream to recreationists and the destruction of the game fish in the river would have a bearing on the whole country.

TRAPPING WATERFOWL ALLOWED IN ENGLAND.

A recent conversation with a well-known sportsman naturalist who has just returned from England brought out the astonishing information that the trapping of waterfowl attracted to a locality by decoys is still allowed in Great Britain. This method of securing game birds has been frowned upon for many years in America and the average sportsman would point out the great danger to waterfowl as the result of such methods. Yet, apparently, waterfowl shooting continues to be good in Great Britain. What the compensating factors are, we do not know. We wonder whether there is as concentrated hunting and as many hunters in England as there are in America.

GOOD BLACK BASS FISHING IN LAKE COUNTY.

Few Californians realize the splendid black bass fishing to be had in Lake County. With favorable weather conditions, the finest sport can be obtained. The season, which usually begins on April 1, has been rather late this year, nevertheless, a catch of twenty-two was made during April. Sportsmen of Lake County are offering a fifty dollar prize for the largest black bass taken during the season. The two fish standing highest thus far in the contest weigh six pounds four ounces and seven pounds twelve and three-quarters ounces respectively. The fish from Clear Lake and Blue Lakes, coming from cold water, are much more palatable than those taken from the warm muddy water of our larger streams. The lakes of Lake County deserve to be the mecca for the black bass fishermen of middle and northern California.

LAKE COUNTY SPORTSMEN ORGANIZE.

Lake County sportsmen always noted for their interest in fish and game, have lately organized the Lake County Fish and Game Protective Club. They have already lined up one hundred and eighty men to attain the following objects:

"The protection and conservation of fish and game abounding in Lake County in particular and the State of California in general; to promote and encourage clean and law-abiding sport with rod and gun, target and trap shooting, and other forms of sport which may be indulged in under the supervision of this Club and at all times, to insistently discourage any and all violations of the fish and game laws of this State, and to lend assistance wherever and whenever possible to the proper authorities in prosecuting any and all such violators."

The dues of the organization are only one dollar a year. Already traps have been installed at Lakeport, and money has been appropriated for a permanent acquarium in San Francisco to boost the black bass fishing in Lake County. Deputy J. D. Dondero has been active in forming this new club.

JUDGE CLAYTON AND THE MIGRATORY BIRD LAW.

If all Federal judges delivered charges of a similar character to that of United States District Judge Henry D. Clayton, it is believed that the people generally would be educated up to the point where they would recognize the need for such laws as the Federal Migratory Bird Treaty Act and would demand a strict observance and enforcement of it. In delivering his charge to the grand jury at the spring session of the United States court at Opelika, Alabama, on April 4, this judge devoted a portion of his address to the Federal Migratory Bird Treaty Act.

Judge Clayton spoke as follows:

"Gentlemen of the grand jury, I call your attention to our National Migratory Bird Law. I do this for the purpose of asking you to examine into any infractions of this law, and also for the purpose of directing public attention as far as I can to this important subject, to the end that uninformed sportsmen may not violate the law and to warn those who are not sportsmen that they must not violate the law."

He emphasized also the need for those who know of the law and who realize its importance to talk on the subject at every convenient opportunity, especially, to the young people, in order that they might be better informed.

To the sportsmen he said:

"Every man who loves the sport of shooting should send a request to the United States Department of Agriculture and ask for Bulletin 1138, which contains the game laws, state and Federal. It will cost only the postage on his letter or card."

In conclusion Judge Clayton laid particular stress on the fact that Congress and the courts aimed to uphold this law. His closing statement was as follows: "Let me emphasize the fact that it is the intention of Congress and the courts to have this law enforced."

RESOLUTION ON THE CONSERVATION OF FISHERIES.

The following resolution has been submitted to a conservation committee of the San Diego Society of Natural History:

WHEREAS, It has been repeatedly shown and is well-known that over-fishing has depleted or destroyed the fisheries of anodromons and of ground fishes in easily accessible coastal waters everywhere to the serious injury of peoples dependent upon them for food;

WHEREAS, There is evidence that the rapidly improving methods of fishing are threatening pelagic fisheries with similar depletion or destruction;

WHEREAS, These dangers to both types of fisheries are seriously increased by the use of enormous nets and other gear which injure or capture many fishes not salable or which injure and fail to capture many of those salable which escape to die because of their injuries;

WHEREAS, Due to use of such gear there is further danger to such fisheries by disturbance and breaking up of spawning beds for either themselves or fishes upon which they prey;

WHEREAS, There is frequent wilful violation of protective laws on the part of commercial fishermen, especially certain aliens who also wantonly waste and destroy great quantities of sea foods which they can not successfully market; and

WHEREAS, It cannot be expected that commercial fisheries under a system of open competition can possibly protect these marine resources from dangerous exploitation; be it

Resolved, That this organization urge upon our people the necessity of providing adequate limitation as to numbers and equipment of commercial fishermen, together with complete prohibition of net and other gear which is highly destructive or injuriously disturbing to marine conditions of life;

That we deplore the activities of destructive and irresponsible aliens for which we urge completely repressive measures;

That we hereby approve and sustain those efforts of our public officials which tend to preserve these valuable resources, and

That we urge and encourage these officials to still greater effort as opportunity may be found in that direction.

CHINOOK SALMON IN LAKE ONTARIO

The United States Bureau of Fisheries, during the fiscal year 1919, planted 434,500 Chinook fry and 149,500 Chinook fingerlings at different points in Lake Ontario, and these fish, which have now reached a length of about ten inches, have been found at the mouth of the Niagara River.

Mr. H. Otto Wagner of Youngtown, New York, who operates a fishery at the mouth of the river, states that sixteen of this species have been caught which were all about the same size. An expert in the Bureau of Fisheries identified two fish sent by Mr. Wagner to the commission on October 27, 1920, as Chinook salmon nearing the end of the second year of growth. — *The Conservationist*, March, 1921.

THE FISH AND GAME COMMISSION PATROL SERVICE.

In considering the patrolling duties of the Fish and Game Commission, we are convinced that those entrusted with this responsibility are leading a very active life.

The patrolling service consists of the water patrol and the land patrol forces.

Patrol Boats.

In 1910, the patrol boat "Quinnat," which is a cruiser, or raised deck type of boat, was built for the commission, and today the commission has six patrol boats for the enforcement of the fish and game laws of the state.

San Francisco Bay and the near outside waters are covered by the boats "Quinnat" and "Steelhead," the river fishing districts by the boats "Rainbow," "Barracuda" and "Shad." The first two are commercial fisheries patrol boats, while the other three come under the heading of general patrol, as they have considerable game as well as fisheries patrol work to do.

The "Albacore," built in 1918, is used for the patrol of southern California waters. It is sixty feet in length with a cabin and accommodations for six persons. The boat is used for patrolling and investigation work from Santa Barbara to San Diego. The average mileage for this boat for the twelve months during 1920 was 541.6 miles per month—this figure includes all time lost in lay ups, stopping for repairs, etc. And although the figures for 1918-1919 are not at hand the mileage was probably more.

Land Patrol.

Patrol by land and water are closely linked together, for in connection with the Commercial Fisheries' patrol service there are three men in the employ of the commission who work about the piers and the fishing docks. Such patrolmen are stationed at San Pedro, San Diego and San Francisco. The man at San Francisco gives this branch of the work all of his time.

Aside from the water front patrol there are the game wardens and the deputies who also work out from each district office. A number of these men have automobiles, and in the mountainous and wild trail country the distances are covered on horseback. The average number of miles covered per month by automobile by the deputies of the commission has been estimated to be 935. During the trout planting seasons, their travel is necessarily heavier than during the other seasons of the year, for the two Fish and Game Commission distribution cars must be met by the men with their trucks to handle the shipments of fish, and the distribution ars alone covered during the past two seaons 65,000 miles. Without in this instance mphasizing the other phases of the work of these men it is interesting to see how perpetually the men of the patrol force must be "on the job" in the discharge of their duties.

MUNICIPAL CAMPS INCREASE IN NATIONAL FOREST PARKS.

Free permits for eight municipal recreation camps in the national forests of California have been issued by the Forest Service of the United States Department of Agriculture. This state is taking the lead in establishing these camps, where the residents of the cities which maintain the camp may obtain a summer outing at cost.

Last year four such camps were operated in the California National Forests —two by the city of Los Angeles and one each by Sacramento and Oakland. These four represent an investment of $70,000, and nearly 5000 guests were accommodated.

This year Los Angeles will have a third camp in operation, and San Diego and Fresno and Riverside counties expect to open camps also. In addition to its camps, the Los Angeles Playground Department organizes and supervises two-week hiking outings in the Angeles Forest. Three of the eight camps are in the

Angeles, two in the Cleveland, and one each in the Sierra, Stanislaus and Eldorado National Forests. The camps are from 25 to 150 miles from the municipalities that maintain them.

Only residents or taxpayers of the municipalities that operate the camps are eligible as guests, and, because of the low cost of the outing, each camper is required to render on an average one hours' daily service as outlined by the director in charge, and must also furnish his own bedding. Guests are well housed, fed, and entertained. The following rates for a two-week outing, including transportation, were in effect last year:

National forest.	City.	Name of camp.	Mls. to cmp.	Cost.
Angeles	Los Angeles	Beeley	75	$12.75
Do	do	Radford	96	14.25
Stanislaus	Oakland	Oakland	150	18.00
Eldorado	Sacramento	Sayles Flat	90	25.00

These rates were all for adults, and the rates for children under 10 were from 50 to 60 per cent of the above. The lower rates at the Los Angeles camps are probably accounted for by the fact that these camps have been in operation for several years, while 1920 was the first season for Sacramento and Oakland. The Los Angeles camps accommodated over 3500 of the 5000 guests at the municipal camps in the national forests of the state. The business men of Sacramento are so well pleased with their municipal camp that they are raising a fund of $10,000 to be donated to the city to build permanent cabins at the camp for sleeping quarters, such as are already installed at the Los Angeles camp.—*United States Department Agriculture* Weekly News Letter.

ESTABLISH QUARANTINE ON FOXES IMPORTED FOR BREEDING.

To protect owners of fox farms, the Secretary of Agriculture has ruled that all foxes offered for importation into the United States from any part of the world, except those imported for zoological gardens or similar institutions, shall be subject to inspection by an inspector of the Bureau of Animal Industry. The foxes must also be quarantined under the supervision of the inspector of the bureau until it can be determined by inspection or examination whether they are affected with a contagious disease. If such disease is found, the animals must be returned to the country of origin or be destroyed. This regulation goes into effect June 1, 1921.

The new regulation states that permits must be procured for all foxes offered for importation into the United States as provided by Regulation 11, for the importation of cattle, sheep, goats and swine, and all foxes imported for breeding purposes must be entered through ports designated for the entry of foxes as follows: Boston, Massachusetts; New York, N. Y.; Rouses Point, N. Y.; Calais, Maine; Pembina, North Dakota; and Seattle, Washington.

They must be accompanied by an affidavit made by the owner or importer declaring clearly the purpose for which the foxes are imported, viz, whether for breeding purposes or for zoological gardens or other institutions. Feed, attendants, and quarantine will be at the expense of the owner, and each owner or his agent shall give satisfactory assurance to the inspector at the time of admission to quarantine that such provision will be made. The place of quarantine, its construction, arrangement, and equipment will be subject to the approval of the Bureau of Animal Industry.

The demand for fur and the attractive prices which it commands has interested many people who are favorably situated to breed fur-bearing animals. A number of fox farms have been established in the northern states. To encourage this work and to guide those who undertake it, the department has published Farmers' Bulletin 795, the Domesticated Silver Fox; and Yearbook Separate 693, Fur Farming as a Side Line; and Department Circular 135, Maintenance of the Fur Supply.

THE SILVER FOX RANCH AT LAKE TAHOE, CALIFORNIA.

Mr. William Lewis, of Lake Tahoe, returned from a trip east last October with ix splendid specimens of registered silver black foxes to add to his ranch. These were all purchased from the Borestone Mountain Fox Ranch of Onawa, Maine, after careful inspection of the best

ranches in Canada and the United States. The present investment is still further proof of Mr. Lewis's confidence in this most interesting breeding industry. His ranch is at Pomin's, in a beautiful situation on the shore of Lake Tahoe. It has been built according to the most modern methods and is today probably the most up to date ranch in the west, containing nothing but high-grade registered stock.

Mr. Lewis believes in purchasing animals only from such high type blood-lines as have actually proved their value in competition. It was for this reason that he purchased all his stock this year from the Borestone Mountain Ranch, which the recent fox shows have proved is the leading ranch of North America. Mr. Lewis reports that this ranch is on the top of a mountain in an ideal situation in the heart of the Maine woods. But the fundamental reason the Borestone foxes are today the champion prize winners over all other foxes, Canadian or American, is due to their careful breeding. Their owner, Mr. R. T. Moore, a graduate of Harvard and the University of Pennsylvania, has made a study of the breeding methods, employed in the development of our famous race horses and registered live stock and has applied them to the improvement of foxes.

That these methods have been successful has been proved at the big fox shows, held in the East, at Boston, Montreal and Muskegon, during the past two years. At the very first live fox show the Borestone foxes swept the prizes, winning as many ribbons and cups as were won by any three competitors. A pup, eight months old, Borestone Sirius, was awarded the grand championship over all the adults. Among his competitors was the brother of "Reid," a fox that subsequently won the championship of the Montreal Show in 1920, and is owned by Mr. Moore.

At the much larger show held in Boston last December, the Borestone foxes again triumphed, winning fourteen ribbons and five of the eight silver cups offered for thoroughbreds. Of the three remaining cups, one was awarded to the Borestone ranch, but was refused by the owner, as he had offered it himself, and a Borestone fox tied at 93¾ points for the other two. In addition a fox born on the Borestone ranch, "Borestone Loami," was awarded the highest score in the show, 96 points, winning two silver cups and the nternational Championship of North America. In the field against her were one hundred and fifty foxes and forty of these were of the best Canadian strains, seven of which had already won prizes at the Montreal Show. One of these defeated oxes, subsequently, won the grand championship of the Muskegon Show, where the Borestone foxes were not entered. Mr. Moore now owns the grand champions of he three big fox shows and the only two foxes, that have ever been awarded 96 points or more:

Borestone Loami 96 points, International Champion, Boston, 1920.

Borestone Reid, 96 points, Grand Champion, Montreal, 1920.

Borestone Sirius, 93 points, Grand Champion, Boston, 1919.

Nearly every fox purchased by Mr. Lewis is closely related to these famous animals, or to the other eleven prize winners, of the Borestone ranch. His 'Tahoe Loami" is a daughter of the famous "Borestone Loami," his "Tahoe Otto" is a half brother of the same fox, and "Tahoe Lone Star" is a nephew of "Sirius" and also of "Borestone Rigel" 94½ points, champion pure black fox. With such stock the Tahoe ranch has a splendid foundation, and under the ideal conditions at Tahoe will no doubt make a plendid showing.

Fox breeding today is beyond the exerimental stage. It has been placed upon sure foundation by the progressive work f the American Fox Breeder's Association. Until this association was formed t was impossible for a novice to tell the difference between poor foxes and good ones. Many inferior animals were sold at fabulous prices by unscrupulous fox raders and promoters. This will no onger be possible, if the prospective fox breeder will take advantge of the opporunities, provided by the American Association, for him to differentiate between good and bad stock. First of all, they have established a standard of perfection, by which a fox may be judged. Second, they created an advanced registration system, by which all superior foxes, that should attain 85 points or more under the standard of perfection, could be registered as of undoubted first quality. Third, due to Mr. Moore's enthusiastic

promotion and energetic effort, despite the cold water thrown on the movement by the older breeders, the first live silver black fox show was held in Boston. It was a complete success both financially and otherwise. The Canadian government sent the chiefs of their department of conservation to it, to consider the possibilities of holding a similar show, and the Montreal show of 1920 was the result.

As a consequence of these innovations, the prospective purchaser can now be sure of getting really first quality foxes for his money. He should insist that the parents of his foxes are, not only pedigreed and registered animals, but that they are also in the advanced registered class. Better still, he should, if possible, attend one of the big fox shows and there see for himself what kind of foxes are awarded the prizes.

The American Association is really a national organization, for the members of its board of governors hale from all parts of the country. Recently Mr. Lewis has been honored by being made a governor of this association. Through him it will be possible for all fox breeders of the extreme West to keep in touch with the American Association and the latest developments in this fascinating new industry.—J. H. SANDERS, *Truckee, Calif.*

WILD FOWL NEED PROTECTION AND FEEDING GROUNDS.

Although legislative measures for the protection of wild fowl have multiplied, and have added to the restrictions on hunters, these regulations have not been sufficient to maintain these game birds in their former abundance. Regions that once were the summer homes of myriads of wild ducks have been drained and placed under cultivation, and extensive areas where the birds at one time bred are now populous farming communities. These changes, say biologists of the United States Department of Agriculture, have crowded out the former feathered residents and have served in a corresponding degree to reduce their numbers. Realization of these facts has led recently to the adoption of other measures to encourage waterfowl. A number of extensive marsh areas have been made permanent refuges under the guardianship of the Department of Agriculture, and many private preserves, some formed by artificial means, have been established where the birds are protected while nesting. In addition, in a number of cases, rigid local restrictions have been placed upon hunters.

As a means of cooperating in such efforts to maintain and increase the numbers of waterfowl, the Biological Survey of the United States Department of Agriculture has undertaken investigations of the general conditions under which wild ducks live and thrive, coupled with counts of the birds found in areas varying in character. During three summers, field studies were made dealing with wild ducks in the Bear River marshes in Utah, a report of which has just been published by the department in Department Bulletin 936, Wild Ducks and Duck Foods of the Bear River Marshes, Utah.

During the three seasons devoted to this work, twelve species of ducks and the Canada goose were found breeding in the region included in the Bear River marshes, which covers an extensive area at the northern end of Great Salt Lake. In an enumeration made during May and June, 1916, of the eleven species of breeding ducks, 3,650 pairs were counted, and it is believed that this number represents between 60 and 100 per cent of the total number of breeding ducks occurring there that season. Allowing five young reared to maturity as the average for each pair, and considering 1916 as an average season, the bulletin states that, at a conservative estimate, between 25,000 and 30,000 wild ducks, native to the marsh, are to be found there at the close of the breeding season.

It was found that, in addition to the large number of birds reared on the Bear River area, many other ducks came in after the nesting season to remain there until fall. That birds from the Bear River section range widely after leaving these marshes has been shown by records of ducks that have been banded and released there and subsequently were shot elsewhere. Records thus obtained show that birds released near the mouth of Bear River in migration cover the region from Oklahoma to Texas and west to California. The department urges the establishment of a greater number of preserves where

wild fowl may breed and rest unmolested, and find an ample supply of food.—*United States Department of Agriculture.*

BIRD BANDING.

The first American to become interested in the banding of birds was the great nineteenth century naturalist, Audubon. Curious to know what became of the birds that flew south with the approach of cold weather, he put threads about the legs of a brood of phoebes that he had been watching and in the following spring was rewarded by having two of the birds return to nest near the haunts where they had learned to fly. Bird banding is not confined to the banding of non-game birds alone. In the United States Department of Agriculture Weekly News Letter, of June 1, 1921, there is the following interesting article on the banding of ducks:

When a wild duck decides to move from his summer home in Canadian wilds he neglects to leave a forwarding address to indicate where his winter quarters are to be established. The Bureau of Biological Survey, United States Department of Agriculture, is working on a method to offset the duck's carelessness. This consists of a system of trapping the birds and marking them with aluminum leg bands that carry a number and the legend "Biol Surv., Wash., D. C." When a banded duck is killed, the hunter removes the band and returns it to the Biological Survey with information showing when and where the bird was recovered.

During the past autumn a Canadian collaborator of the Survey, Mr. H. S. Osler, operated a duck trap at Lake Scugog, Ontario, where he captured and banded over 200 black ducks and mallards, with a few ring-necked ducks and blue-winged teals. Some of these were killed near the place where they were banded, but others were from such localities as to indicate approximately the route taken by these birds in their journey to the Southland. In all, about 25 of Mr. Osler's ducks have been killed and the bands returned from points in Ohio, Indiana, Kentucky, Tennessee, Arkansas, Mississippi, Louisiana, and Texas. One of the blue-winged teals was killed near Port of Spain, Trinidad, British West Indies, more than 2,500 miles from Lake Scugog, where the band was attached.

The systematic banding of birds, as undertaken by the Biological Survey, will furnish conservationists with much valuable information.

FACTS OF CURRENT INTEREST.

Deputies Clark and Burke arrested six Japanese near Pigeon Point, San Mateo County, for having 150 undersized abalones in their possession. These men were notified to appear before Judge Ray Griffin, which they did, and were fined $100 apiece.

* * *

Mr. Jay Bruce, state lion hunter, succeeded in killing nine mountain lions during the first three months of the year, as well as three bobcats.

* * *

Deputy Von Arks made cases last year within a five-mile radius of his home, in Sonoma County, which brought in fines aggregating thirteen hundred dollars. Deputy Von Arks evidently believes in cleaning up his home town first.

* * *

During February and March there was a round up of violators of the fishing laws in district twelve. Sixteen men were arrested of whom six were convicted, the fines totaling $695. Four nets totaling 667 fathoms were confiscated. Two of them were sold and netted $145. During March deputies O'Connell and Newsome confiscated seven nets, totaling 2295 feet, which were being illegally used in a closed district.

* * *

Deputies Groves, Lencioni, and Von Arks, working the coast between Russian Gulch and Wallalla at low tide, arrested sixteen violators for having in possession undersized abalones. The offenders were taken before Judge Charles of Sea View and the fines will aggregate over seven hundred dollars. The largest fine was one hundred and twenty-five dollars, which was awarded a market fisherman. The small sized abalones confiscated totaled several hundred.

HATCHERY NOTES.

W. H. Shebley, Editor.

As the egg-collecting operations at the various hatcheries have not been entirely completed yet, we are, consequently, unable to definitely submit the number of trout fry which will be available for distribution from the various stations during the coming season. We anticipate that the output from all of the hatcheries of the state for the year 1921 will be approximately 25,000,000 trout fry. If the number of trout fry actually distributed even approximates this figure, it will be the largest distribution of fry ever made in one season in the state.

Due to adverse climatic conditions in some sections of the state, we did not take as many eggs at the spawning stations as we had anticipated; but this partial failure is, in a great measure, offset by favorable situations obtaining in other districts.

MOUNT SHASTA HATCHERY.

From present indications, we will have for distribution from Mount Shasta Hatchery this season, approximately 11,000,000 trout fry consisting of rainbow, Loch Leven, German brown, eastern brook, steelhead, and possibly a small number of black-spotted trout fry.

The Loch Leven and German brown and practically all of the eastern brook trout eggs were taken from the adult fish kept as a breeding stock in the Mount Shasta Hatchery ponds. The rainbow eggs were received from the several rainbow egg-collecting stations located on tributaries of the Klamath River, Siskiyou County.

In addition to the rainbow eggs hatched at the Mount Shasta Hatchery, a sufficient supply of eggs of this specie were received to permit of shipments being made to Mount Whitney, Ft. Seward, Kaweah and Wawona hatcheries. The supply of steelhead trout eggs which is being hatched for distribution from the Mount Shasta Hatchery was received from the Brookdale and Ukiah hatcheries.

The two fish distributing cars are in the shops of the Southern Pacific Co., at Sacramento, being overhauled and placed in first-class condition for the season's operations. The work on the two cars is practically completed and at least one car will be ready for commencing the season's operations on or about June 1.

Distribution operations from the Mount Shasta Hatchery will be commenced nearly a month earlier than is usually the case. It was essential that we commence this work earlier than in former years owing to the greater number of trout fry which we will have to distribute from that station this year.

As mentioned in a previous issue of California Fish and Game, there were hatched at the Mount Shasta Hatchery this season nearly 6,000,000 chinook salmon eggs, which were received from the Federal Bureau of Fisheries' station at Mill Creek and from our own salmon egg-collecting station at Klamathon, on the Klamath River. As soon as the oldest of the salmon fry were of suitable age for planting, they were distributed in the head waters of the Sacramento River and the balance of 3,000,000 were removed from the hatching troughs and placed in the three large salmon rearing lakes on the Mount Shasta Hatchery grounds. These fry will be fed and held over the summer and released in the head waters of the Sacramento River during the fall months.

FALL CREEK HATCHERY.

Rainbow egg collecting operations at the Fall Creek Hatchery were very successful, there being nearly 1,000,000 eggs of this specie collected. Approximately 600,000 of the eggs have been hatched and will be held throughout the summer months and distributed in the Klamath River at the proper season. The balance of the eggs were shipped to the Mount Shasta Hatchery to be hatched and reared for distribution in other localities of the state.

In addition to the rainbow trout hatched at Fall Creek station, 3,000,000 of the salmon eggs collected at Klamathon Hatchery last fall were hatched and are being reared for distribution in the Klamath River. A portion of the fry will be planted during the late spring months and the balance will be held in ponds constructed for the purpose last summer, and

one additional pond which is now in course of construction. These fish will be held and fed throughout the summer and distributed in the Klamath River next fall.

BOGUS CREEK STATION.

Bogus and Camp Creek egg-collecting stations have been closed after completing the most successful season since the stations have been established. Over 6,000,000 rainbow trout eggs were collected from these two stations during the season which has just closed. All of the eggs collected were shipped immediately to the Mount Shasta Hatchery for incubation. During the summer some minor repairs and improvements will be made at these plants in order that they may be in readiness for operations next season.

HORNBROOK STATION.

The Hornbrook station was operated during the past season, but the number of eggs collected was far below the normal take, less than 200,000 eggs being taken during the entire season. This was due to the fact that the flood waters of the early part of the spawning season changed the course of Cottonwood Creek, forming a sandbar between the old mouth of the stream and the new cut, which prevented the trout from entering the stream to spawn. Prior to the cutting of the new channel, the flood waters were entirely over the top of the racks, thus permitting the first part of the run of spawning fish to pass on up the stream. The small number of eggs taken were received from the few stragglers which came up the creek through the old channel.

Before the station can be successfully operated, it will be necessary that considerable work be done in opening up an adequate channel to permit the fish to ascend the stream at the mouth of the creek.

MOUNT WHITNEY HATCHERY.

During the early part of December, 300,000 Loch Leven trout eggs were shipped to Mount Whitney from Mount Shasta Hatchery and during the first part of April, 500,000 rainbow trout eggs were shipped from the same station. Shipments of steelhead trout eggs to the number of 800,000 were made to the Mount Whitney Hatchery from Brookdale Hatchery. The fry resulting from these three hipments of eggs are developing into fine, healthy fish, and will be ready for distribution early in the summer.

Further shipments of rainbow trout ggs will be made from one of the other tations and we are also contemplating opening up the Rae Lakes rainbow egg-collecting station. All eggs received from his source will be immediately transported o the Mount Whitney Hatchery, where they will be hatched and reared.

LAKE TAHOE HATCHERY.

The new Lake Tahoe Hatchery, which was completed last fall, was opened for operations on May 14. A shipment of black-spotted trout eggs was taken to the hatchery on that day from the new egg-collecting station established on Blackwood Creek. Other shipments of black-potted eggs will be forwarded as the eggs are taken at Blackwood Creek. Shipments of steelhead trout eggs from the Brookdale and Ukiah hatcheries have been shipped to the Lake Tahoe Hatchery, and within the next two or three weeks ainbow eggs will be shipped in from one of the rainbow egg-collecting stations.

MOUNT TALLAC HATCHERY.

Mount Tallac Hatchery was opened for operations during March. As in former ears, seining operations were conducted at the mouth of Taylor Creek, for the pawning trout from which are obtained the black-spotted trout eggs.

In addition to the egg-collecting operations conducted off the mouth of Taylor Creek, an egg-collecting station was es-ablished on the upper Truckee River. The stream was racked, and a trap, tank, etc., were installed. The results obtained from the operations to date have been very atisfactory.

As above mentioned, a station was put n operation at Blackwood Creek and the ggs received from this plant are incubated t the Mount Tallac Hatchery and the new Lake Tahoe Hatchery. One million black-spotted trout eggs have been taken to date.

FORT SEWARD HATCHERY.

The 500,000 chinook salmon shipped to Fort Seward from the Mount Shasta

Hatchery during February were hatched and the resulting fry distributed in Mad River, tributaries of Humboldt Bay, Eel River and other waters of Humboldt County. This was done during the month of April. Two hundred and fifty thousand rainbow trout eggs were shipped to Fort Seward from Mount Shasta Hatchery on May 16, and the resulting fry appear to be strong, vigorous fish. Over 800,000 steelhead eggs were shipped in from Ukiah Hatchery and these, together with the rainbow fry, will be given a wide distribution in the waters of Humboldt, Mendocino and Trinity counties during the coming summer.

SNOW MOUNTAIN STATION.

Steelhead egg-collecting operations at the Snow Mountain egg-collecting station did not prove to be as satisfactory as was anticipated. While there was a fair rainfall in that section this season and other climatic conditions were favorable, the usual number of steelhead spawn fish did not reach our station. Consequently, we were unable to take the usual large number of eggs. Approximately 2,000,000 eggs were taken as a result of the entire season's operations. We had expected to receive not less than 4,000,000 and possibly 5,000,000 or 6,000,000. A thorough investigation as to the reason for the failure of the spawning fish to ascend the stream to the Cape Horn dam, where our station is located, resulted in our finding that the stream had been blocked by fences, cleverly arranged in the Eel River, some distance below our stations. These had been constructed by persons who wished to prevent the fish from ascending the stream, in order that they might catch them. Those responsible for this outrage should be prosecuted to the full extent of the law, particularly since the legislature has just passed an act making it unlawful to bar the passage of fish by any weir, fence or obstruction.

The eggs taken at Snow Mountain station, with the exception of about 200,000, which were hatched for distribution in the upper waters of the Eel River, were immediately transported to Ukiah Hatchery.

UKIAH HATCHERY.

The Ukiah Hatchery was opened for operations on March 19. A total of 1,859,000 eggs were received from the Snow Mountain station. These were yed and shipments made to the Fort Seward, Mount Shasta and Lake Tahoe hatcheries. Between 500,000 and 600,000 teelhead eggs will be hatched at Ukiah Hatchery for distribution in the streams f Mendocino and Sonoma counties.

SCOTT CREEK STATION.

Egg-collecting operations at Scott Creek tation have been the most satisfactory ince the station was established. Three million steelhead trout eggs have been colected and operations have not as yet been ompleted. There will probably be somehing over 100,000 eggs yet taken. All eggs were transported to the Brookdale Hatchery as soon as the fish were spawned.

BROOKDALE HATCHERY.

As stated above, the Scott Creek station produced well over 3,000,000 steelhead trout eggs, all of which were transported to Brookdale Hatchery where they have been eyed and shipments of eggs nade to the Mount Shasta, Mount Whitney, Lake Tahoe, Wawona and Kaweah hatcheries. In addition to eggs shipped out to the above named stations from the Brookdale Hatchery, approximately 900,000 steelhead fry will be reared for distribution in Santa Cruz, Santa Clara and San Mateo counties. Arrangements are being made for the shipments to these three counties.

DOMINGO SPRINGS HATCHERY.

Domingo Springs Hatchery was opened or operations during the middle of March nd preparations were made for trapping he run of rainbow trout ascending Rice Creek to spawn. Severe storms in hat section made it very difficult for the nen to get into the station. They were bliged to go in over fourteen feet of snow n some places.

The heavy snow did considerable damge to the racks and traps at Domingo Springs Hatchery, and also to the fishculture equipment installed at the mouth of Warner Creek last fall. It is our intention to operate at Warner Creek this season, in conjunction with the Domingo Springs Hatchery, where all eggs secured rom the former plant will be incubated. At this date no eggs have been taken at

Domingo Springs or Warner Creek as the "run" of spawning fish from Lake Almanor is very late, but we anticipate a very successful take of eggs.

CLEAR CREEK HATCHERY.

The Clear Creek Hatchery was opened for operations during the middle of March, as were the Domingo Springs and Warner Creek stations. Egg-collecting operations are somewhat earlier at Clear Creek than at Domingo Springs and to date we have secured approximately 1,500,000 eggs. A portion of the eggs secured from the Clear Creek and Domingo Springs hatcheries will be hatched at these two stations to supply local streams with trout fry, and the available balance will be shipped to the new Feather River experimental station.

FEATHER RIVER EXPERIMENTAL STATION.

As mentioned in a previous report, we are establishing an experimental hatchery on Jamison Creek, a tributary of Feather River. The station is located between Blairsden and Johnsville, in Plumas County. The purpose of establishing a station at this point is to eliminate, to a great extent, the necessity of transporting trout fry from the Mount Shasta Hatchery to stock the waters in this district, as well as the district along the Yuba River, in the vicinity of Sierra City.

Eggs will be shipped to this hatchery from the Domingo Springs and Clear Creek stations. The first shipment of 200,000 eggs was delivered from Clear Creek Hatchery on May 16. On May 14, a shipment of 100,000 steelhead trout eggs was received from the Ukiah Hatchery. The eggs appear to be in first class condition. As soon as the eggs commence to hatch, we will be better able to determine what the outcome of the experiment will be.

If there is no loss of fry or eggs, additional eggs will be shipped to the station and this large territory will be supplied with trout fry from the experimental hatchery during the coming season.

NORTH CREEK HATCHERY.

Egg-collecting operations at North Creek station have been very successful. Eggs have been collected from the large rainbow trout ascending North Creek, Metcalf Creek, and Grout Creek from Bear Lake, and while operations at present are not complete, we expect to take 2,500,000 rainbow trout eggs this season. One million five hundred thousand eggs will be transferred from the North Creek Hatchery to the Bear Lake Hatchery, at Green Spot Springs, from which station the resulting fry will be distributed during the coming summer in Big Bear Lake and various streams of San Bernardino County. The North Creek Hatchery will also be operated to full capacity. The fry reared at this plant will be distributed in Big Bear Lake also. We also expect to have a couple of small shipments of eggs to send to the Mount Whitney Hatchery where they will be hatched for distribution in other waters of southern California.

WAWONA HATCHERY.

Three hundred thousand rainbow eggs, and 100,000 steelhead trout eggs from Brookdale Hatchery, have been shipped to Wawona from the Mount Shasta Hatchery and the resulting fry will be distributed in Merced River and other streams of that section during the coming summer.

Previous to opening the Wawona Hatchery for operations on April 23, certain necessary repairs were made to the flume and water distributing system at the hatchery. All the repairs could not be finished this spring, consequently, we will have to complete the work after the fry have been distributed during the summer.

KAWEAH HATCHERY.

Owing to the fact that we were unable to proceed with the construction of the permanent hatchery on the Kaweah River, it was necessary that we again operate the small experimental station established three years ago near the town of Hammond. Three hundred thousand rainbow and 100,000 steelhead trout eggs were shipped to Kaweah Hatchery and the resulting fry will be distributed in the waters of Tulare County, as has been our practice during previous seasons.



FIG. 53. Planting trout in Yosemite National Park; necessitating transportation by rail, motor truck and pack train. Photographs by H. C. Bryant.

COMMERCIAL FISHERY NOTES.

N. B. Scofield, Editor.

NEW COMMERCIAL FISHERIES LEGISLATION.

The past session of the State Legislature was remarkable in that there were fewer fish and game bills for the Fish and Game Committees to consider than for many sessions. Most of the bills introduced proposed only minor changes in already existing laws. The opinion is quite general that the present game and fisheries laws are fair and in the interest of conservation. There is also a stronger inclination for the legislators to seek and accept the advice of those of the Fish and Game Commission who have made a study of the fish and game conservation problems.

The few bills affecting the commercial fisheries which finally were passed were all good bills and received the signature of the Governor. These bills become laws on July 29, 1921. The following is a brief summary of the fisheries bills which were signed by the Governor, taken up in the order of their introduction:

Senate Bill No. 265. By Senator Rigdon.

Abalones and Clams.

Amends the present law, section 628*f* of the Penal Code.

Reduces the daily bag limit on Pismo clams from 36 to 15, but permits shipment and sale. Changes the abalone seasons by making a uniform closed season for all species of abalones from January 15 to March 15. Raises the minimum size limit on red abalones, which may be taken for commercial purposes to eight inches in greatest diameter. Restricts the commercial taking of abalones in districts 10 and 18 to the territory lying outside of a line twenty-five feet beyond low tide mark. The minimum size limit on red abalones which are taken from the shore to twenty-five feet beyond low tide mark, remains at seven inches in greatest diameter, but the number of any species of abalones which may be taken from this inshore area must not exceed ten per day and they must not be sold.

It is expected that this law will greatly reduce the commercial taking of Pismo clams and give visitors to the beaches where these clams are found an opportunity to gather enough for their own use. It is hoped and expected that the changes in the abalone law will permit the full utilization of this valuable food resource and provide enough abalones for those who prefer to gather their own from the shore.

Senate Bill No. 576. By Senator Rominger.

Fish Reduction.

This bill amends section 5 of the act regulating the use of fish in reduction plants, etc. The present act, which was passed two years ago, intended to give the Fish and Game Commission full power to regulate the use of fish in reduction plants, but in a recent friendly suit in Los Angeles to determine if it did give the power intended, it was the opinion of the court that it did not. Therefore, section 5 was amended and enlarged so as to prohibit direct fishing for edible fish for reduction purposes and to prohibit taking any fish in excess of what can be converted into human food except by special application to and permission from the Fish and Game Commission. Such excess of catch can not in any case exceed 25 per cent of what is used for human food.

Senate Bill No. 644. By Senator Lyon.

Kelp Harvesting.

A new act which supplements an act regulating the cutting and harvesting of kelp.

The present law worked all right during the period of the war when kelp potash brought a very high price, making it profitable to cut the kelp and transport it long distances to the reduction plants. The conditions are different now and all of the kelp companies have ceased to operate. The price of potash has fallen to such a figure that it will not pay any company to engage in the kelp reduction industry unless by-products in addition to potash can be made use of and even then they cannot operate profitably unless they are assured of a continuous supply of kelp

close at hand. Under the old law any licensed company could cut kelp on any of the beds which had been declared open for cutting by the Fish and Game Commission. The result of this arrangement was that many companies wished to cut in the beds located near the better harbors and these beds were quickly exhausted, compelling the companies to frequently go long distances for their supply of kelp.

It was to encourage the reestablishment of the kelp industry by leasing to a company those kelp beds or positions of beds which lie close at hand, that this bill was drawn.

Senate Bill No. 811. By Senator Scott.

Shrimps.

Amends section 628 of the Penal Code.

Provides that the unmarketable shrimps which are taken in district 13 (South San Francisco Bay) while fishing for the fresh shrimp market, may be dried.

After much experimenting it has been found that the small shrimp unsuitable for the markets, cannot be screened out and returned to the water alive as was intended under the old law. The shrimps are easily screened after cooking for they are then doubled up and the small ones screen out, but efforts to screen them before cooking failed. The smaller shrimps are perfectly good for drying purposes and this law will prevent a considerable waste and possibly result in a reduction in the price of fresh shrimps.

Assembly Bill No. 485. By Mr. Gray.

Districts.

Amends the act dividing the state into fish and game districts.

The changes in this act which will affect commercial fishing are:

District 7 is extended to the south line of Mendocino County in order to take in the salmon trolling territory at Fort Bragg and Shelter Cove which need different regulations from the rest of district 10 in which they were before. (See under Assembly Bill No. 832.)

Vallejo Channel and the lower end of Napa River are stricken from district 12 B, thus throwing them into district 2, where netting is prohibited.

The southern limit of the netting district, 12 B, is placed at the right of way of the Santa Fe Railroad instead of the south boundary of San Joaquin County. Netting south of the Santa Fe right of way is prohibited.

Districts 20 and 20 A (Catalina Island) re changed. District 20 will extend from South East Rock to Lions Head, taking in about two-thirds of the waters on the ast and northeast side of the island. District 20 A will consist of the remaining tate waters surrounding the island. Jnder the provisions of Assembly Bill No. 831, netting is permitted in district 20 A, but in district 20 netting is not only rnlawful but the possession of nets in the district is prohibited.

Assembly Bill No. 830. By Mr. Stevens.

Striped Bass; Shad.

Amends section 628 *a* of the Penal Code.

Closes the fall netting season for striped bass and shad on September 17, instead of September 25, thus conforming o the new closing date for salmon netting.

Provides that no more than five salmon may be taken per day in district 2 and prohibits taking striped bass less than twelve inches in length with hook and line. The minimum size which may be taken with nets remains at three pounds. Prohibits the possession or sale of striped bass weighing more than ten pounds, during the months of April and May.

Provides that striped bass which are legally taken during the open season may be held through the closed season of June and July under regulations to be prescribed by the Fish and Game Commission.

Assembly Bill No. 831. By Mr. Stevens.

Nets and Lines.

Amends section 636 of the Penal Code.

Provides that gill and trammel nets of not less than seven and one-half inch mesh may be used for salmon only during the months of June and July in district 12 B.

Prohibits the possession of beach seines, ound-haul or purse nets in districts 12 nd 12 B.

Prohibits the use of fyke nets for taking cat fish.

Permits the use of crab traps in those districts where crab nets are allowed.

Prohibits the possession of nets in district 20.

Assembly Bill No. 832. By Mr. Stevens.

Salmon.

Amends section 634 of the Penal Code.

This bill is of importance for it places further restrictions on the taking of salmon which show that they are in need of additional protection. The suggestion for salmon conservation made in the last issue of CALIFORNIA FISH AND GAME were largely followed in this bill. The rapid increase in the catch by outside sea trolling, left the salmon insufficiently protected. It was the object in this bill to cut down the catch about equally in all districts and not cut down the river catch alone as suggested by the outside trollers, or cut down the outside catch alone as suggested by the river fishermen.

The upper Sacramento River district 12 A netting season was reduced fifteen days so that the open season for that district is the months of January to April, inclusive. For the balance of the river, the fall netting season was closed eight days earlier. These eight days are taken from the time when the run is heaviest and amounts to much more than the short time would indicate. This provision will cut down the river catch a little over 10 per cent.

A closed season is provided for Monterey Bay of January, February and March, which will cut down the catch in pounds at that point about 10 per cent. As this season comes at a time when small, immature salmon are taken in numbers the saving in numbers of fish is more than the saving in weight indicates. A closed season from March 1 to April 15, is provided for district 10 and a closed season of March and April for district 7. These two last are outside trolling districts and the closed season is to protect the immature salmon which are caught at the beginning of the season.

The bill provides that Eel River be closed to the use of nets after January 1, 1922, but permits the commercial taking of salmon on the lower river by trolling during the months of September, October and November.

Assembly Bill No. 1015. By Mr. Benton.

Croakers, Halibut and Barracuda.

Amends section 628 *e* of the Penal Code.

Prohibits the sale of California whiting, yellow-fin and spot-fin croakers. The sale of California halibut under four pounds in weight, or of barracuda under three pounds in weight or of albacore under six pounds in weight is prohibited as in the old law. In addition to the non-sale of these last three kinds of fish, this bill prohibits the possession of over fifty pounds of undersized fish.

FISHERIES NOTES FROM SAN PEDRO

Eight fishermen were arrested and convicted during April and May, 1921, for violations of the state fish laws pertaining to district 20. One of the heaviest fines imposed was meted out to Tony Marincovich, a San Pedro fisherman, in the justice's court at Avalon, Catalina Island, on May 13, 1921. Defendant in this case was fined $500 with the suspended jail sentence of one hundred days for maintaining a net in district 20 in violation of section 636.

The first albacore taken by a local boat this season was brought to San Pedro on June 8. Six fish averaging about sixteen pounds each were taken with jig lines.

The new fireproof cannery of the Halfhill Packing Corporation, recently completed on Channel 3 at Long Beach, is being put in readiness for the tuna season. In the meantime this company will pack chicken.

A decision that may affect the common practice by canneries in receiving tuna "subject to condition after cooking," was given by Superior Judge C. S. Crail at Department 4 in Los Angeles on June 9, in action brought by the crew of the "Golden Gate" for fish refused as unfit for canning purposes. Judgment was granted in favor of the plaintiff for seven and one-half tons of spoiled fish. This decision may result in fishermen taking more care with their catches on account of the possibility of canners refusing any fish that looks doubtful.

The boat "Kotobuki," Captain M. Yamamoto, arrived in San Pedro on June 13, with eight and one-half tons of seaweed (*Gelidium sp.*) taken in Mexican waters. The entire load was consigned to the American Agar Company in Glendale, California, which company is en-

gaged in manufacturing agar-agar. This seaweed was taken near Point Banda in approximately three to four fathoms of water by means of hooks attached to long poles.

PACIFIC FISHERIES SOCIETY MEETING.

The Pacific Fisheries Society will hold its annual meeting at the University of California, Berkeley, on August 4, 5 and 6. Some interesting papers will be read and discussions held on the development and conservation of the commercial fisheries as well as on the subject of sport fishing. The meetings will be of interest to those engaged in the fishing industry as a business, as well as to those interested in problems of conservation, for an effort will be made to get these two factions into close touch with each other. The final program will be announced about the middle of July. Some of the papers will cover the following subjects: Whales and Whale Fisheries of California; Seals and Sea-lions of California and their relation to the Fisheries; Fisheries Investigations of the California Fish and Game Commission; Future of the Pacific Coast Salmon Industry; Relation of Hydro-electric Power Development and Irrigation Projects to the Salmon Industry and to Trout Fishing; Fish Canning and Inspection; Fisheries Schools, etc.

The affiliated societies of the Pacific Division of the American Association for the Advancement of Science will also meet at Berkeley during these three days. The public is invited to these meetings. Papers relating to the fisheries will be given before several of these societies and any one attending the meeting of the Pacific Fisheries Society will have an opportunity to hear them.

Saturday, August 6, will be given over to many field excursions to visit places of scientific interest and to visit the local fisheries. Further information may be obtained from the secretary of the Pacific Fisheries Society, Mr. George F. Sykes, Corvallis, Oregon, or from the Department of Commercial Fisheries of the Fish and Game Commission at San Francisco.

STATE FAIR EXHIBIT OF FISHERIES

The Fish and Game Commission has secured twenty-four by forty feet additional space in the main exhibit building at the Sacramento State Fair and will enlarge the scenic and live fish display which has been one of the most attractive exhibits at the fair during the past two years. An area of sixteen by forty feet will be devoted to an educational exhibit of the state's fisheries resources and to the fisheries conservation work of the commission.

NOTES FROM THE STATE FISHERIES LABORATORY.*

WILL F. THOMPSON, Editor.

THE PERSONNEL.

The Fish and Game Commission has lost the services of Miss Helen M. Edwards, who married Mr. Samuel Bacon the latter part of April. Miss Edwards has been acting as scientific assistant to Mr. Thompson during the stay at Hopkins Marine Station, Pacific Grove. Her

*California State Fisheries Laboratory, Contribution No. 28.

The listing of small publications of members of the laboratory force together with the Fish Bulletins issued by them has led to some confusion. Hereafter these will be numbered as sent to the printer, not according to the date of printing. The correct numbers are as follows:

Fish Bulletin No. 4, contribution No. 22.

The Future of the Sardine, California Fish and Game, Volume 7, No. 1, contribution No. 23.

Notes from the State Fisheries Laboratory, in California Fish and Game, Volume 7, No. 1, contribution No. 24.

The Abundance of Young Pismo Clams, in California Fish and Game, Volume 7, No. 2, contribution No. 25.

Quarter-oils or Half-pound Ovals, in California Fish and Game, Volume 7, No. 2, contribution No. 26.

Whales and Sardines, California Fish and Game, Volume 7, No. 2, contribution No. 27.

place will be hard to fill, but nevertheless, the best wishes of all with whom she has been connected in her work go with her.

Besides Miss Edwards, the commission has had Mr. Thompson and Mr. W. L. Scofield at the Hopkins Marine Station during the past year, pending the construction of the new laboratory at San Pedro. In anticipation of the beginning of building operations, Mr. Thompson has transferred his residence to San Pedro. This has somewhat crowded the quarters there as they are now constituted, but it is hoped that this will not be permanently the case. Mr. W. L. Scofield has also left the Hopkins Marine Station, going to Palo Alto, where he will work at Stanford University for several months. This leaves no one at present in Pacific Grove. The Fish and Game Commission owes much to the Marine Station for the space kindly granted its workers.

During the coming summer, Mr. O. E. Sette will be engaged in work for the commission in continuation of his sardine studies which he has been pursuing at Stanford University. He will make his headquarters at San Pedro with the other members of the laboratory staff.

THE LIBRARY FOR THE NEW LABORATORY.

The work of collecting a library for the scientific work to be carried on in the new laboratory has been under way some time. There have been many difficulties in the way, such as the unsettled conditions in Europe, the determination of the method of purchasing such periodicals as are desired, etc., but it is now hoped that the more serious of these have been overcome. There are now on our shelves the complete publications of the Scottish Fishery Board, together with those of the Irish and British governments; the Reports and Bulletins of the Bureau of Fisheries of the United States; the Reports of the Dove Marine Laboratory; the Danish, Dutch and Norwegian government publications; those of the Canadian government; of the states of Rhode Island and Massachusetts; of the Province of British Columbia; and many separate volumes bearing on fishery matters. We have to thank the Dove Marine Laboratory, Prof. E. E. Prince of Canada, the Danish, Dutch and the Norwegian Fishery authorities for their generous donation of literature. There are now well toward completion the negotiations for the purchase of all the well-known scientific journals which are specially devoted to the subject of fisheries, and it is hoped that by the time the next issue of CALIFORNIA FISH AND GAME appears, we will be able to record the arrival of many of these. The low exchange value of the money of various European nations has rendered the purchase much less expensive than would have been the case previous to the war.

It is unfortunate that some of the sets obtained, notably that of the Bureau of Fisheries of the United States, are somewhat incomplete because certain numbers are out of print. We greatly desire to obtain these, however, and would be much obliged to anyone assisting us by the donation of odd issues of the various sets we may desire.—W. F. T.

THE BASKING SHARK AT MONTEREY

The Basking Shark, known to science as *Cetorhinus maximus*, has been recorded several times from Monterey, but its occurrence is nevertheless an interesting event, especially to the fishermen. This giant shark, with its gill openings extending well around toward the front of its throat, always attracts much attention when brought ashore. At Monterey it is usually taken in the lampara or gill nets, in which it becomes entangled until it is supposed to smother to death by the closure of the gill openings. It does great damage to the net in the meanwhile, and the fishermen do not welcome it. On May 3, 1920, a specimen was brought in to the wharf at Monterey, and measured by W. L. Scofield, who found it to be twenty-two feet long from the tip of the snout to the end of the tail. Again, in April, 1921, a specimen twenty-four feet in length was brought in by a lampara fisherman. In the endeavor to recoup some of the loss caused by the damage to his nets he exhibited the great shark for an admission charge. It is said that he failed in the venture.—W. F. T.

A RAG FISH AT MONTEREY.

There are several "rag" fishes found on our coast, one of which is hereby noted as occurring at Monterey. Mr. Higgins has had the good fortune to find a still rarer member of the group, and describes it below. The specimen found at Monterey was *Icosteus aenigmaticus* of Lockington. It was taken during 1919, but the date and place of capture, save that of Monterey Bay, was not recorded. The specimen at hand is twenty-three centimeters in body length, and twenty-seven and three-tenths in total length.

The salient characters of this "rag" fish are its lack of stiff bones, which makes it much like a thick, flat, bundle of rags, its yellowish color with purplish spots of irregular shape, and the row of spined scales along the lateral line. The fin rays are all of them covered by small spinules. It is very evidently a fish from the deep water, but just what depth we cannot surmise. It may be a pelagic.—W. F. T.

A STRANGE RAG FISH AT SAN PEDRO.

Closely related to the family of rag fishes, of which *Icosteus* is the typical genus, is the little known species, *Acrotus willoughbyi*, Bean. A specimen was taken in a mackerel net off San Pedro, March 31, 1921, and brought to the wholesale markets. We were unable to obtain the specimen as it was sold for exhibition, but careful measurements were made and there can be little doubt of its correct identification.

The fish was fifty-seven inches long, fourteen inches deep, and rather flattened laterally. The body was very limp and yielding as in other members of this group, due to the cartilaginous nature of the skeleton, the flesh was soft, and the naked skin tender and easily broken. The mouth was large, with thick lips, the nose broad and rounded, resembling with its large nostrils the muzzle of a calf. The fish was so fragile that it was somewhat mutilated when it reached the market, the gaff having torn through the jaw when landing the fish from the net.

The first or type specimen was taken in 1887 on the coast of Washington, apparently thrown up from deep water in a storm. Another was taken there subsequently, and one was taken at Monterey. This occurrence is especially noteworthy as the species has rarely been seen by naturalists and has never before been taken on this part of the coast.—E. H.

CUTLASS FISH TAKEN OFF LONG BEACH.

Following the practice of noting the unusual, the occurrence of the cutlass fish, *Trichiurus lepturus*, Linnaeus, which has recently come to the notice of the laboratory staff, entirely incidental to the regular work, may be here recorded.

Two specimens were taken, one on the first and another on the fourth of January, 1921, off Long Beach, in from three to five fathoms of water. They are each about two feet long, one and three-quarters inches deep, and very much compressed laterally. The mouth is large with long sharp teeth, the eyes large, and the skin is naked and of silvery color. The dorsal fin extends the length of the body to the long thread-like tail.

The species is common in the West Indies, and has been reported on the Atlantic coast as far north as Cape Cod. It is known in the Pacific from Panama, Lower California, and Japan, but this is probably its first appearance in this region.—E. H.

THE GRUNION.

The traditional spring spawning runs of the grunion on the sandy beaches of southern California have created the usual excitement at Long Beach this spring. These little fish, as described by Mr. Will F. Thompson in Fish Bulletin No. 3, come up on the beach with the high tides of the second, third and fourth nights following the full moon of the spring months, to deposit their eggs in the sand away from their enemies in the ocean. Although the deposited eggs are free from most enemies, great numbers of the spawning fish are taken by the "grunion hunters," who gather on the beach at about high tide and capture the fish as they are left on the sand between waves.

On March 23, the first night upon which a run might be expected, no fish were observed to be spawning. No observations were made on the two following nights, but during the second scheduled run, April 24, 25 and 26, large runs were observed on all three nights.

Runs were also reported to have occurred during the high tide of the new moon period early in May, but the extent and dates of these runs are not known. The full moon run in May, seemed to be a little out of the ordinary, as on the first night of the run, May 23, a considerable stretch of beach was carefully watched, but no spawning fish were observed, only a small number being seen in the surf. The presence of the fish in the surf was also made evident by the capture of quite a number by the use of a net in the shallow waves. On May 24, the run was but little better than that of the night before. The many people who scanned the beach were able to collect a few fish by wading out into the shallow receding waves, but very few fish were observed to be spawning. The results of a search for eggs in the sand on May 25, verified the conclusions from the observations of the two nights before, for only two pods of eggs were found as the result of quite extensive digging. The run of May 25 seemed to be normal in every way and many people who had searched the beach in vain the two previous nights were well paid for their efforts with a good supply of fish.—H. B. H.

LIFE HISTORY NOTES.

INTRODUCED DOVE THRIVES IN LOS ANGELES.

The Chinese spotted dove (*Spilopelia chinensis*), as a resident of Los Angeles first came to my attention in 1917, when a dead bird was found by school children in Hollywood. The skin of this specimen was preserved and is now in the museum of the Nature Study Department of the Los Angeles County schools.

At that time it was said to be common in a restricted locality in northern Hollywood. Reports of its occurence have increased in frequency and from a much wider area, until in the first week of April, a bird was noted by the writer, at close range, near the museum in Exposition Park.

Various reports as to the origin of this colony have not satisfactorily established whether the progenitors were liberated, or whether they were escaped cage-birds. The fact remains that the species is firmly established, and as a city-dweller, safe from hunters, is rapidly increasing in numbers.—L. E. Wyman, *Museum History, Science and Art, Los Angeles, California.*

MOUNTAIN LION SWIMS RIVER.

It seems to be the general belief that the mountain lion is very shy of water, and that he will go out of his way in order to avoid crossing a stream when it is necessary for him to swim. My experience in trailing lions does not bear out this impression. In fact, two male lions which I killed at different times in Shasta County were voluntarily swimming the McCloud River, at different places, on every trip around their beat. Deer were as numerous on one side of the river as on the other, so it was not necessary for the lions to cross in order to get food. And as in each instance, the tracks were several hours old, it is apparent that these lions did not swim the river to confuse or avoid the dogs, but that they were merely following their natural instinct.

Another instance of this kind was in January, 1921, when I was hunting from Kinsley Ranger Station, Mariposa County, in the company of Mr. Joseph Dixon of the Museum of Vertebrate Zoology. After several days of storm, the weather cleared about dark on the evening of January 19. There was about six inches of snow on the ground when we left camp early on January 20. At about 9 a. m. we found the track of a large male lion on Grizzly Mountain. The tracks were about twelve hours old when we found them, which was indicated by the condition of the snow where the tracks were made.

On account of the dense brush in places we were unable to keep up with the dogs. As a result, by the time we had trailed the lion about six miles south to the north rim of the Merced River, and at a point about 2000 feet above the river, we

could just faintly hear the hounds baying as they crossed over the south rim, at about the same elevation. We hurried down the mountain to the river and soon found the tracks of the lion and dogs entering the water on a sand bar at about 600 feet west of the mouth of Slate Gulch and about three miles east of Briceburg.

I was sure that the dogs would tree the lion before night, so that I was determined to follow them, although Mr. Dixon had had to return to Berkeley. As the river was about 100 feet wide and too cold and swift to swim with safety, I decided to build a raft. I stopped a passing telephone lineman and got some spikes from him. Then I gathered some discarded railroad ties and driftwood and built a raft at the upper end of a pool. Using a piece of driftwood for a paddle, I ferried across. The dogs had crossed the river at about 12 o'clock noon and by the time I had built the raft and crossed to the south side it was 2:30 p. m.

I soon found the track of the lion and dogs climbing the mountain on the south side of the river. After trailing them about two miles up the ridge toward Filiciana, I heard the dogs barking "treed" in the head of a short canyon on the west side of Slate Gulch. When I arrived at the tree, the lion jumped out, but treed again about a hundred yards farther up the canyon. He was lying in the narrow fork of a tall live oak and when I shot him through the heart with the revolver, he sank into the fork and died.

Then I climbed the tree and tried to dislodge him, but as he weighed about 160 pounds, and as it was necessary to lift the carcass about four feet to slip the hips through the fork, I was unable to free him. I then thought of cutting off one of the forks with my skinning knife. By this time, it was getting quite dark and a storm was threatening, and with a hard, rough trip of two miles down the canyon and the river to cross, I decided to cut the carcass in two behind the shoulder and drop the front half to the ground, leaving the rear half in the tree.

By the time that I reached the river, it was quite dark and as the raft had drifted half way down the pool while I was crossing earlier in the day, I was forced to abandon the raft, on the return trip, near the north bank, and wade out to avoid being carried into the rapids. I now walked three miles down the river to Briceburg where I arrived about 8 p. m., after being on the trail fourteen hours.

This lion had crossed the river probably ten hours ahead of the dogs and was following his regular beat as I found his old tracks while trailing him on the south side of the river. There was also the skeleton of a calf near the place where the lion was treed. He had probably been killing cattle there during the summer.—Jay C. Bruce, *San Lorenzo, California.*

CURLEW NUMEROUS.

Since its protection, the Hudsonian curlew (*Numenius hudsonicus*) is becoming more numerous again, in this vicinity. I have lived and hunted in this country around Rio Vista from boyhood and have entertained a number of the most prominent sportsmen from many states on my reserve, and I have naturally taken a keen interest in the wild game life of the locality. I have heard the old settlers here tell how the jack curlews were upon these plains in countless thousands at one time. Whether they were killed off or inhabited another region, I am unable to relate, but I do know that for the last twenty years at this season of the year we have only seen an occasional flock. However, about a week ago I noticed a flock of about one hundred of these birds on the pasturage grounds each day. The flock has been increasing until it has reached about five times its original size. On April 26, 1921, about sunrise, I saw a flock of about five thousand which all seemed to be whistling at the same time. I was greatly astonished, as I had never seen these birds in such numbers before. This large flock did not stop in this vicinity, but traveled straight on southward; and each day I have seen curlew still migrating to the south, but not in such great numbers. There are a great many here at present, yet they are not so numerous as they were a week ago. They are evidently traveling to a new feeding ground.—S. C. Church, *Rio Vista, California.*

ALBINO DEER SEEN IN THE STANISLAUS FOREST.

On February 1, of this year, Ranger Freer saw a white or albino mule deer in the Stanislaus National Forest. Several months later, on May 7, when Ranger Freer and former District Ranger Fowler were out repairing telephone lines they again saw an albino deer. These two records of the appearance of an albino deer were of unusual interest to us.—J. V. WULFF, *Sonora, California.*

A TRAPPER'S EXPERIENCES.

I laid out my first line of traps on the twenty-fifth of October, 1920, stringing them from Logan Meadow north to the junction of the main and West Chiquito creeks, crossing here and keeping along the ridge until opposite Placer Station, where I crossed over and continued north to Arnold meadow. Then I crossed back to Logan via Mebold and Summit meadows, covering about thirty miles each day. Of course, I later varied this line in several respects, at one time running up the Joaquin to Squaw Dome, and again trapping the other side of the river as far down as Kaiser crossing.

My first catch, on the twenty-sixth of October, consisted of three grey foxes and one skunk. All of these skins were exceedingly blue and unprime, so I set all traps off that day and left them until the fifteenth of November, and even then I caught foxes that were not at all prime. In my mind there is not the slightest doubt but that the trapping season is at least one month too early even for that country; yet there are always trappers at work on the first day of the season (October 15) as low down as Finegold. Then they wonder at the prices which they receive for their furs.

For coyote bait I used squirrel meat ground very fine, to which I added a small amount of tincture of asafetida (God only knows how to spell that word—but you know what it is—I used to wear it around my neck to prevent diseases when I was a kid) and some oil of rhodium. I set three traps in a Y form, driving a stake through the rings completely out of sight, and covering the whole thing over very carefully. In the course of two months, I was able to so set such a group of traps that the coyotes would take enough notice of it to turn a trap over once in a while, or scratch the bait from the center of the set. I then found that they were suspicious of any set that was bounded on any side by any obstacle whatever—and after that I set them in the openings; and this was the secret of the whole game. I caught seventeen of these so-called coyotes in a very short time. A peculiar thing about them is that, while in the trap, at least, they will utter no sound whatever and, instead of striving to get away, they will simply grovel in the dirt like a domestic dog trying to beg forgiveness; also they will positively not meet your eye. On the contrary with the grey fox—they are continually on the prod and will growl, snap and bark from the time they see you until they are dispatched. I also caught a large black eagle in one of these sets, and he was as docile as a chicken, not even hissing at me when I let him out of the trap. Later I caught another of these birds, but the coyotes found him first and left me only his two feet.

I spoke to you about finding the carcasses of eight deer that had undoubtedly been killed by coyotes. These kills were always in the deep snow and one could visualize every move that was made. In each case the deer was chased by not more than two animals—sometimes only one—and caught by another as he circled back over his trail. I have always read that these animals hamstring a deer, but in so far as I could tell these deer were pulled down from in front by a nose hold, and when you take into consideration the size of these coyotes it does not seem at all impossible. My largest was sixty-two inches long and would weigh something over 100 pounds, but the average was better than fifty-eight inches from tip to tip, and just that much bone and muscle. In broad daylight I saw one carrying a full grown badger by holding it in his teeth and throwing the weight over his left shoulder. When caught in a trap they will tear manzanita bushes over two inches through into the smallest shreds. The one thing I couldn't understand about these killings was that they were all large deer and mostly bucks. It was some little time after the rutting season and after the bucks had plenty of time to regain strength. The last one I

found was about the twenty-fourth of February, and as I attempted to lift the head both horns came off in my hand. This for your information regarding the time deer drop their horns at that elevation. This was a perfect four-pointer.

During my stay in there I saw but one loin track, and though I followed for several miles I could not find where he had either attacked or molested any deer. I am, therefore, of the opinion that a great many of the kills with which lions are blamed should go to the coyote. J. T. Hogue told me that he had found a great many deer killed by lions in his time, but he admitted that he had seen no sign of a lion at a great many of these carcasses and had simply taken it for granted that it was a lion. When the Teafords were in there hunting lion and bear last winter they saw one lion track—this lion had come from Shake Flat across country to the Soda Springs on West Chiquito and straight through to Jackass—in a straight line and with never a stop, although he was passing through a country that literally swarmed with deer of all kinds. Certainly, at that time of year he was going straight through and out of the deer country, and though the boys followed him for two days he did not stop or make a kill of any kind. George Teaford and W. B. Day, both old-timers, tell me that they have seen deer killed by single coyotes—and since these animals of which I speak are not much smaller than the old timber wolf, it does not seem at all impossible.

Unless the price of fur goes up to a point where it will pay to trap these coyotes, or until a bounty is placed on them by the county, it will be but a very few years before they do some real damage to the deer. Of course one wonders why they have not reached such numbers in the past as to have exterminated all of the deer, but I think that civilization is concentrating the deer and the coyotes into such a small tract of land in the hills that the coyote is gaining advantages every year—especially during the hard winters. This same question is asked about the tree bettles—why they haven't destroyed all the timber before, since they were left alone for years—while I know there is a real reason I don't know what it is.

As for deer—our first few months in there we saw great numbers of does, and with every doe there was at least one fawn and sometimes two. Wagner told me that there were a great many barren does, but all the barren does I saw had their fawns close by. And that reminds me of another peculiar thing. There was a cave on the Logan side of the river where I thought there might be a bear or so, and while I was sitting there one day waiting for the dog to come up, so I could send him in, I saw an old doe and two fawns come down to drink on the other side of this river. It was the twenty-sixth of November and the deer had just started running, the first signs of this being on the twenty-fifth. This old doe led both fawns down and they started to drink. As soon as she saw they were busy at it she started up the hill on a dead run, but they heard her and caught her before she had gone 200 yards. She walked calmly back to the river with them again and started them to drinking again. This time she made her get away, although the poor little devils ran and bleated around there for half an hour, until they finally laid down under a big oak and tried to forget it. I do not know that this is the way the doe gets away from her fawns at this time of the year, but this I did see; and I also know that after the season of mating is over she comes back to her fawns again. During November and part of December these little devils were all alone, but at the time we left the hills—February 27—every doe had her fawns with her and seemed as loving to them as ever. The whole trip was the most interesting I was ever on, and I really believe I learned more about nature in those five months than during my entire life.

I had an interesting experience with a skunk. It has been my belief that I was a regular skunk trapper and on this particular day I found a large one in a trap on a sloping hill. The idea is that if you get their hind feet off the ground (their rear muscles being the ones that work the scent bag) you can kill them without smelling up the fur. I, therefore, lifted this fellow off the ground with a pole and hung him by one of the springs of the trap in a manzanita bush. I then walked up very close to him so as to be able to

shoot him through the brain. As I did so he reached one leg behind him, got a purchase on one of the limbs of the bush and shot me square in the eye and ear, at the same time dropping down out of the bush, where he proceeded to work on me from the ground up. As soon as I had sufficiently recovered to open one eye, I took a squint at him and he was sitting there calmly chewing on the fish head with which I had baited the trap. This calmness of theirs impresses me more than anything else that they do, except, of course, the thing I have just mentioned. When you come on them in a trap they will invariably look up at you for an instant and then go on eating, or picking their teeth, or whatever it may be that they are interested in.

After the twentieth of November the large bucks started to come down from the high country, though the spikes and forked horns had been running wild a week previous to this. After that the ground was torn up in huge chunks on every hillside and opening, in the entire forest. It was not my luck to see any real fights, though I heard one time a clashing of horns in the brush within thirty feet of the trail that must have meant trouble. Also, two of the last coyotes that I trapped had large unhealed gashes in their heads and along their sides that could have been made by horns only.—Roy H. Blood, *Madera, California.*

AN OPOSSUM SEEN IN PACHECO PASS.

Last summer I was driving from Fresno to Monterey via Pacheco Pass, when about fifteen miles out from Hollister and east of that place I saw something which at the time I believed to be a cat. Although dark, I had a strong spot light and by using it I could see the shining eyes of the animal. I brought the car to a sudden stop and ran up to where it was lying, whereupon, it started to walk off. I grabbed a small stick and hit it lightly. It lay as if dead—it not only was playing possum, but it was a possum! It had the long slick tail which is similar to the tail of a rat. The hair was gray and white tipped and the face was the bald face of the opossum (*Didelphis virginiana*). I picked it up and held it for a few seconds, but it began to squirm and when I dropped it it ran into the shrubs at the side of the road and was gone.—R. D. Libby, *Fresno, California.*

THE OPOSSUM IN VENTURA COUNTY

Being a southerner and having had, last November, a fine opossum (*Didelphis virginiana*) killed by a friend, and baked with sweet potatoes in the true southern style by an old negro from Dixie, I was particularly interested in the item published in the January number of California Fish and Game.

The opossum, a male, was killed in Ventura County, about two miles up the Santa Clara River from the mouth and was the first one ever heard of in this vicinity. It was larger than any I ever saw in the south—California must agree with them.

Since this opossum was killed, I have heard of two being caught near the line of Ventura and Los Angeles counties, but these were only reports. I did not see the animals myself.—Geo. P. Austin. *Oxnard, California.*

CONSERVATION IN OTHER STATES.

MUSKRAT SEASON CLOSED IN MINNESOTA.

In October, 1920, the department sent out thousands of questionnaires asking for information and an expression of opinion from trappers, fur buyers and dealers, farmers and sportsmen as to what steps should be taken to preserve a breeding nucleus of muskrats.

Fully 90 per cent of the answers favored an immediate closed season. The commissioner petitioned Governor Burnquist for additional protection which was duly granted and order No. 2 was issued protecting muskrats until the close of the 1921 regular session of the Minnesota legislature.

It developed later that muskrats were still numerous in some localities and complaints of the damage to highways and grades poured in so rapidly that the department could not possibly investigate them all. Whereupon another petition was prepared asking for a lifting of the ban in thirteen counties. This was acted upon favorably by Governor Preus and order No. 3 was issued.—*Fins, Feathers and Fur*, December, 1920.

SPORTSMEN'S CLUBS IN NEW YORK

"There are today in New York some 475 sportsmen's clubs comprising a membership of about 40,000 hunters, fishermen, and other conservationists. Even this total, however, is smaller than it should be, in view of the fact that last year some 300,000 persons purchased hunting and trapping licenses in New York—to say nothing of the fishermen of whom no license is required."—*The Conservationist*, April, 1921.

INTEREST IN FISH AND GAME CONSERVATION IN UTAH.

Interest in fish and game conservation in Utah has been greatly stimulated through the efforts of the United States Forest Service, which has organized local fish and game protective associations and unified them into a state organization. Since October, 1920, more than twenty-five locals have been established.

ANNUAL DIVIDEND FROM FUR-BEARING ANIMALS OF NEW YORK STATE.

The game and fur-bearing animals of New York state, if capitalized, are worth not less than $53,000,000; they return an annual dividend of more than $3,200,000; and they cost the state for their protection and increase the nominal sum of $182,000. This cost of protection and increase is thus less than 6 per cent of the annual dividend.

REPORTS.

VIOLATIONS OF FISH AND GAME LAWS.

January 1, 1921, to March 31, 1921.

Offense	Number of arrests	Fines imposed
GAME		
Hunting without license	20	$200 00
Trapping without license	4	40 00
Deer—closed season—killing or possession	23	875 00
Does—spike bucks, fawns—killing or possession	4	475 00
Bear—closed season—killing or possession	1	10 00
Brush rabbits, squirrels—closed season—killing or possession	6	100 00
Quail—offering for sale—excess limit—killing or possession	10	350 00
Doves—closed season—killing or possession	1	25 00
Ducks—excess limit—closed season—killing or possession	12	250 00
Protected shore birds—killing or possession	8	225 00
Non-game birds—killing or possession	17	755 00
Night hunting	12	50 00
Shooting ducks from power boat	1	25 00
Mudhens—killing or possession closed season	1	25 00
Total game violations	120	$3,405 00
FISH		
Angling without license	10	$190 00
Clams—undersized—excess limit—taking or possession	12	310 00
Crabs—undersized—excess limit—taking or possession	16	360 00
Abalones—undersized—closed season—taking or possesion	19	627 50
Lobsters—undersized—taking or possession	1	25 00
Striped bass—underweight—taking or possession	9	155 00
Young fish—taking or possession	2	20 00
Barracuda—underweight—taking or possession	1	25 00
Sturgeon—closed season—taking or possession	1	20 00
Sunfish, crappie—closed season—taking or possession	5	40 00
Trout—excess limit—closed season—taking or possession	7	190 00
Illegal nets in restricted districts	18	595 00
Total fish violations	101	$2,557 50
Grand total fish and game violations	221	$5,962 50

SEIZURES—FISH AND GAME AND ILLEGALLY USED FISHING APPARATUS

January 1, 1921, to March 31, 1921.

GAME.			
Deer meat	376 lbs.	Sunfish	21
Quail	148	Trout	22
Ducks	857	Crabs	2516
Doves, pigeons	1	Abalones	317
Rabbits, squirrels	12	Abalones	6497 lbs.
Miscellaneous birds	30	Clams, pismo	690
Beaver skin	1	Clams, cockle	982 lbs.
Pine marten skins	5	Lobsters	1920
FISH.		Lobsters	100 lbs.
Striped bass	926 lbs.	Illegal nets	16
Barracuda	8625 lbs.	SEARCHES.	
Halibut	5669 lbs.	Illegal fish and game	16

STATEMENT OF EXPENDITURES.

Period from July 1, 1920, to March 31, 1921.

Administration:		
Commissioners	$310 68	
Executive offices	19,169 10	
Printing	4,985 82	
Research and publicity	4,789 95	
Accident and death claims	1,427 61	
		$30,683 22
Commercial fish culture and conservation:		
Superintendence	$11,814 75	
Inspection and patrol	23,754 51	
Research	22,948 71	
Statistics	7,989 15	
Market fishing license commissions	375 50	
Propagation and distribution of salmon	19,739 93	
		86,622 55
Sporting fish culture and conservation:		
Superintendence	$11,203 55	
Printing	198 54	
Prosecutions and allowances	391 85	
Angling license commissions	12,627 40	
Fish exhibits	4,323 19	
General patrol (pro rata share)—		
San Francisco District (40 per cent)	38,943 71	
Los Angeles District (40 per cent)	12,506 31	
Sacramento District (40 per cent)	21,413 88	
Propagation and distribution of trout	109,069 47	
		200,677 90
Game conservation:		
Printing	$267 18	
Prosecutions and allowances	970 73	
Hunting license commissions	19,134 70	
Mountain lion hunting (and bounties)	6,724 76	
General patrol (pro rata share)—		
San Francisco District (60 per cent)	43,283 45	
Los Angeles District (60 per cent)	16,533 10	
Sacramento District (60 per cent)	32,123 74	
		121,173 59
Tahoe camping ground		402 11
		$439,559 37

CALIFORNIA FRESH FISHERY PRODUCTS FOR MONTHS OF JANUARY, FEBRUARY AND MARCH, 1921.

Compiled by Fish and Game Commission, Department of Commercial Fisheries.

Species of fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Colusa, Butte, Tehama, Glenn	Contra Costa, Alameda	San Francisco, San Mateo	Santa Cruz	Monterey	San Luis Obispo, Santa Barbara, Ventura	Los Angeles	Orange	San Diego	Imperial	Total	Mexican, brought into California
Albacore												45				45	
Anchovies								1,850		5,800		2,420		48,555		58,625	
Barracuda											33,041	352,118		332,060		717,219	1,757,921
Bluefish									1,523	16,772						18,295	
Boccaccio								41,043	111,986	347,674						500,703	
Bonito											30	21,671	8	20,203		41,912	22,587
Carp				15,184	35,788		14,857	40								65,869	
Catfish		37,761		5,831	16,386		7,173									67,151	
Chilipepper								22,985	2,513	32,277						57,775	
Croakers												57,327				57,327	295
Cultus Cod	487							35,109	7,727	28,161		297	26	527		72,334	
Dolphin																	
Eels																	
Flounders	9,629		465	1,448			3,060	18,926	9,031	910	105	885				44,459	
Grayfish							176	29,870		565		13,054	4,985	205,381		254,031	
Greenfish																	
Hake								6,690	12							6,702	
Halibut								1,417	472	2,064	69,425	500,138	46,761	202,063		822,340	236,258
Hardhead				324	26,976		34,657									61,957	
Herring	4,994		731				21,220	441,325		1,300	10					469,580	
Kingfish								3,952	30,128	887	32	113,696		1,145		149,840	315
Mackerel										1,442	2,343	704,749	9,952	72,647		791,133	29,684
Marlin																	
Mullet														433		433	7,670
Perch	16,129	62	24,169				14	16,709	1,610	13,998	7	21,795	82	2,066		96,641	3,898
Pike				589	1,815		2,829									4,733	
Pompano									37	174	16	3,622		20		3,869	305
Rock Bass											74	13,913	1,964	17,565		33,516	3 095
Rockfish	1,416		60					125,470	61,417	254,830	21,721	512,851	11,761	261,926		1,251,452	13,610
Sablefish								153,995								153,995	
Salmon	67		194	33,884	27,225	2,383	57,161	112.478	5.633	174,583						413,668	
Sandabs								148 623	13,528	1.313		4,437	5			167,906	
Sardines			98						92	1,479,625		17,200,790	822,175	1,451,914		20,954.694	
Sculpin												8,794		4,974		13,768	312
Sea Bass—Black												4,130		19,050		23,180	21,562
Sea Bass—White									146	110	1,358	43,293	142	39,194		84,243	85,439
Sea Trout												92	2,510			2,602	6,568
Shad				2,505	5,396		17,997	1,320	10							27,228	
Shad—Buck				477	824		4,419									5,720	
Shad—Roe				1,971	930		7,359									10,260	
Sheepshead											2'9	448		9,594		10,311	

Skates								22,295		1,662		1,406	232			25,595	
Skipjack																	
Smelt	8,978		5,502				4,221	51,338	221	4,830	22,629	50,129	921	13,771		162,540	607
Sole								880,307	35,500	14,595	7,224	48,145	729	6,163		992,663	175
Splittail				165	12,169		159									12,493	
Striped Bass			272	9,457	8,622	41	130,414	15,942		15						164,763	
Stingaree												203		1,555		1,758	
Suckers					1,976		85									2,061	
Swordfish																	
Tomcod							20	15,078								15,098	
Trout—Farm																	
Trout—Steelhead																	
Tuna												101		2,209		2,310	682
Tuna—Bluefin																	
Tuna—Yellowfin												1,060				1,060	
Turbot			146													146	
Whitebait			919													919	
Whitefish												12,082		3,013		15,095	606
Yellowtail							516					117,788		76,920		195,224	100,794
Miscellaneous				49				4,633	2,358	3,018	6,617	7,086	857			24,618	200
Total fish	41,700	37,823	32,556	71,884	138,107	2,424	305,837	2,151,395	284,004	2,386,605	164,901	19,818,565	903,110	2,792,951		29,131,862	2,292,577
Crustaceans:																	
Crabs (doz.)	1,048	22	79					9,405	122	5						10,681	
Ecrevisse (doz.)																	
Shrimps								150,189				639	26			150,854	
Spiny Lobsters											13,607	34,223	937	17,727		66,494	383,279
Mollusks:																	
Abalones										235,320	16,686					252,006	8,094
Clams—Cockle	5,466		1,359								276			235		7,336	
Clams—Mixed	4,598		13,519								533	155				18,805	
Clams—Pismo									957		42,758					43,715	
Clams—Softshell	112	2,084	9,145				29,089	12,553								52,983	
Cuttlefish			40					2,217	6,333	13,316		173				22,079	
Limpets																	
Mussels							40		600	485	97	65				1,287	
Oysters—Eastern (No.)			301,181					783,670								1,084,851	
Oysters—Native																	
Snails																	
Squid										32,623		13,225		39,964		85,812	
Miscellaneous:																	
Frogs (doz.)																	
Terrapins (doz.)													61			61	145
Turtles											636					636	
Scallops																	

All amounts shown in pounds unless otherwise specified.

12053 7-21—6000